HIGHWAY COST REPORT AND OUTLOOK

2nd Quarterly Cost Roundup p. 74

ENGINEERING NEWS-RECORD

JUNE 18, 1959

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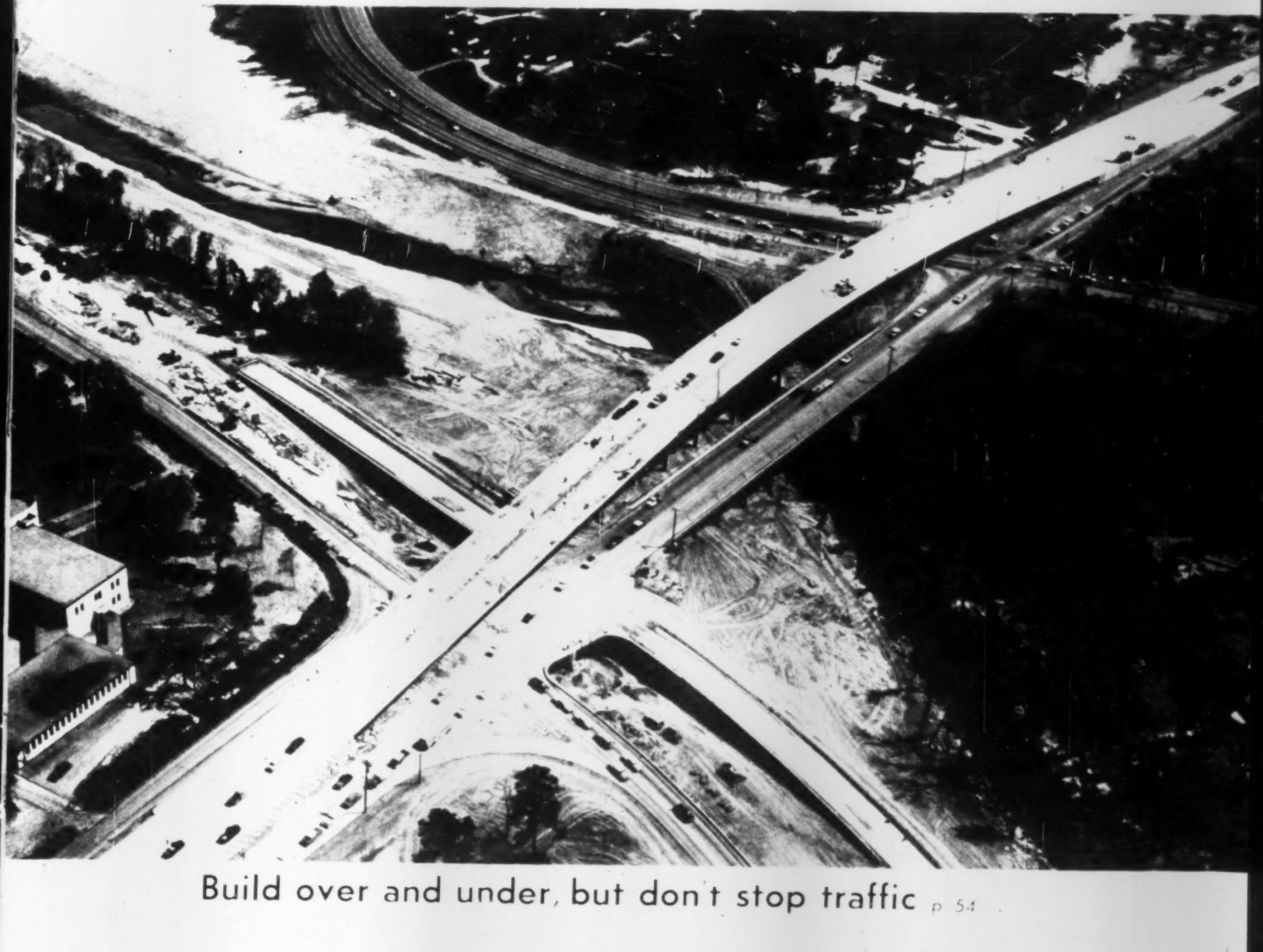

Build over and under, but don't stop traffic p. 54

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ag'gre·gates

Any hard inert material for mixing in graduated fragments with a cementing material to form concrete, or the like.

Webster

Aggregates: stone . . . gravel . . . sand . . . slag. The stuff America builds with. The bedrock of our roads, runways, railroads . . . the guts of the buildings, bridges, dams, docks and sidewalks that make up the face of America.

Today, you have a one-word definition for aggregates . . . VULCAN. Vulcan Materials Company is the nation's No. 1 supplier of aggregates to America's giant construction industry. But . . . Vulcan is *big with a difference*. It gives you *local* service by *local* people familiar with your specific requirements.

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Vulcan Materials Company also produces Concrete Products, Surfacing Materials, Construction Materials, Chemicals and Metallics.

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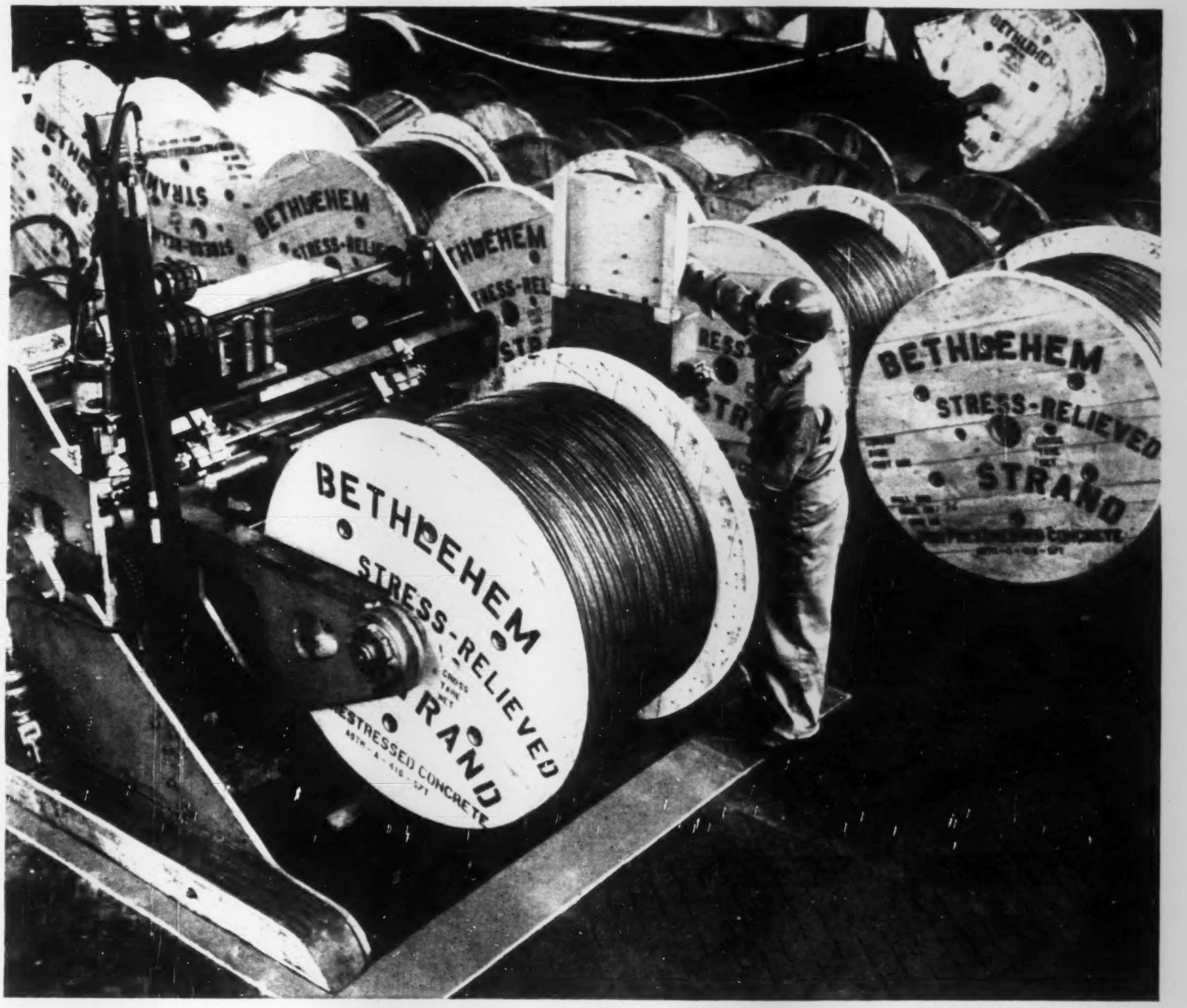

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Can you be sure of "on-time" delivery to the job site?	?	Yes
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Can you avoid costs such as interest, handling, storage, taxes?	No	Yes
Can you count on a fixed, low expense chargeable to one job?	No	Yes
Do you save money?	No	Yes

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EIGHTY-FIFTH YEAR OF PUBLICATION

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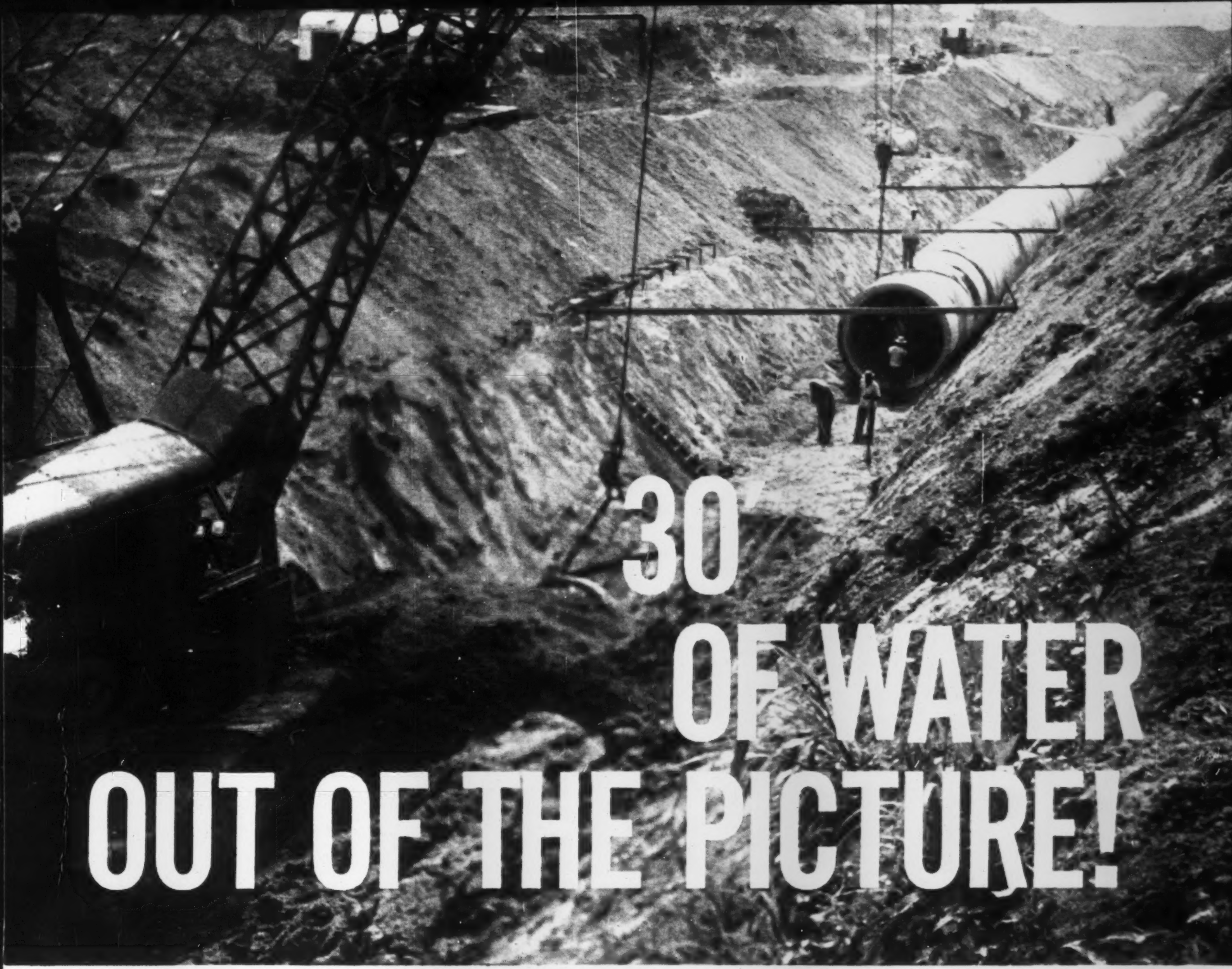

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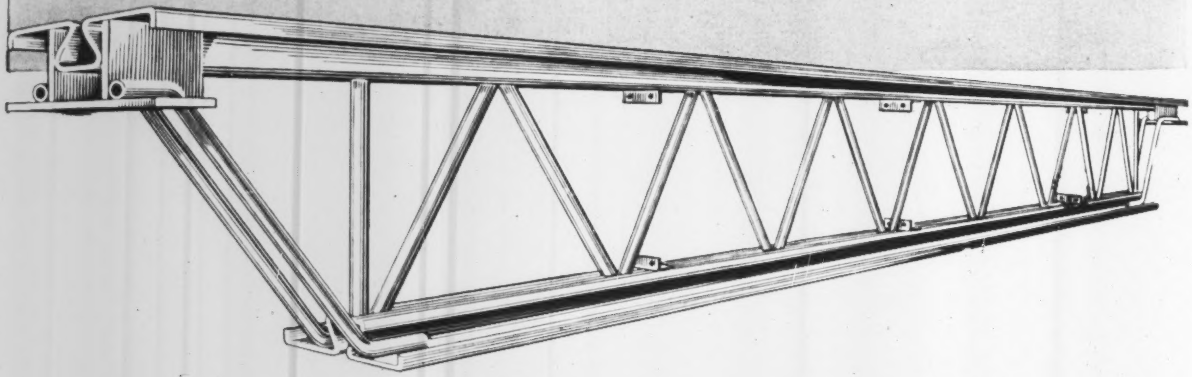

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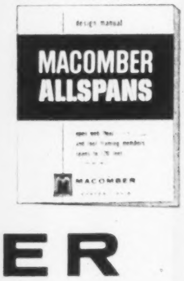

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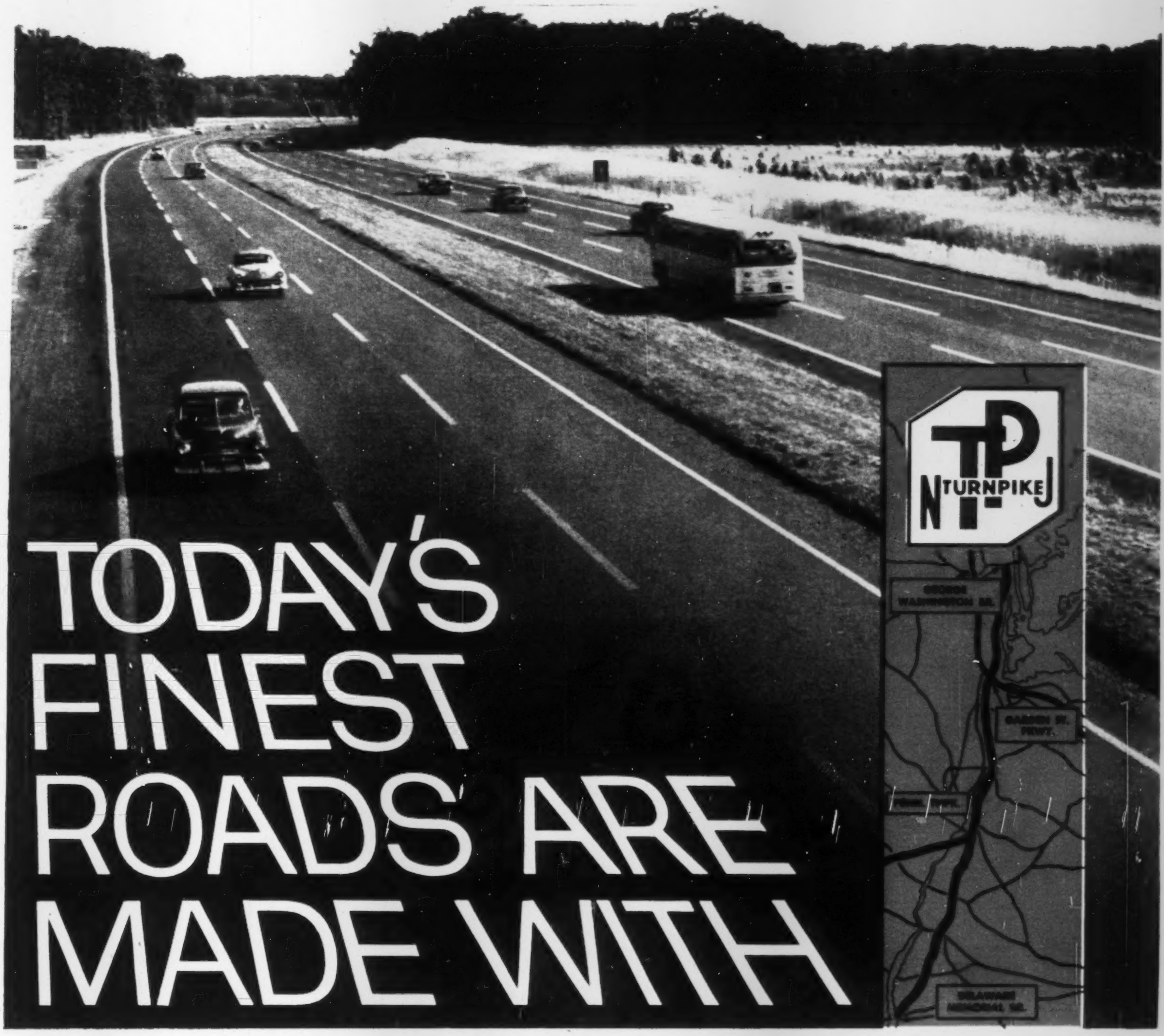

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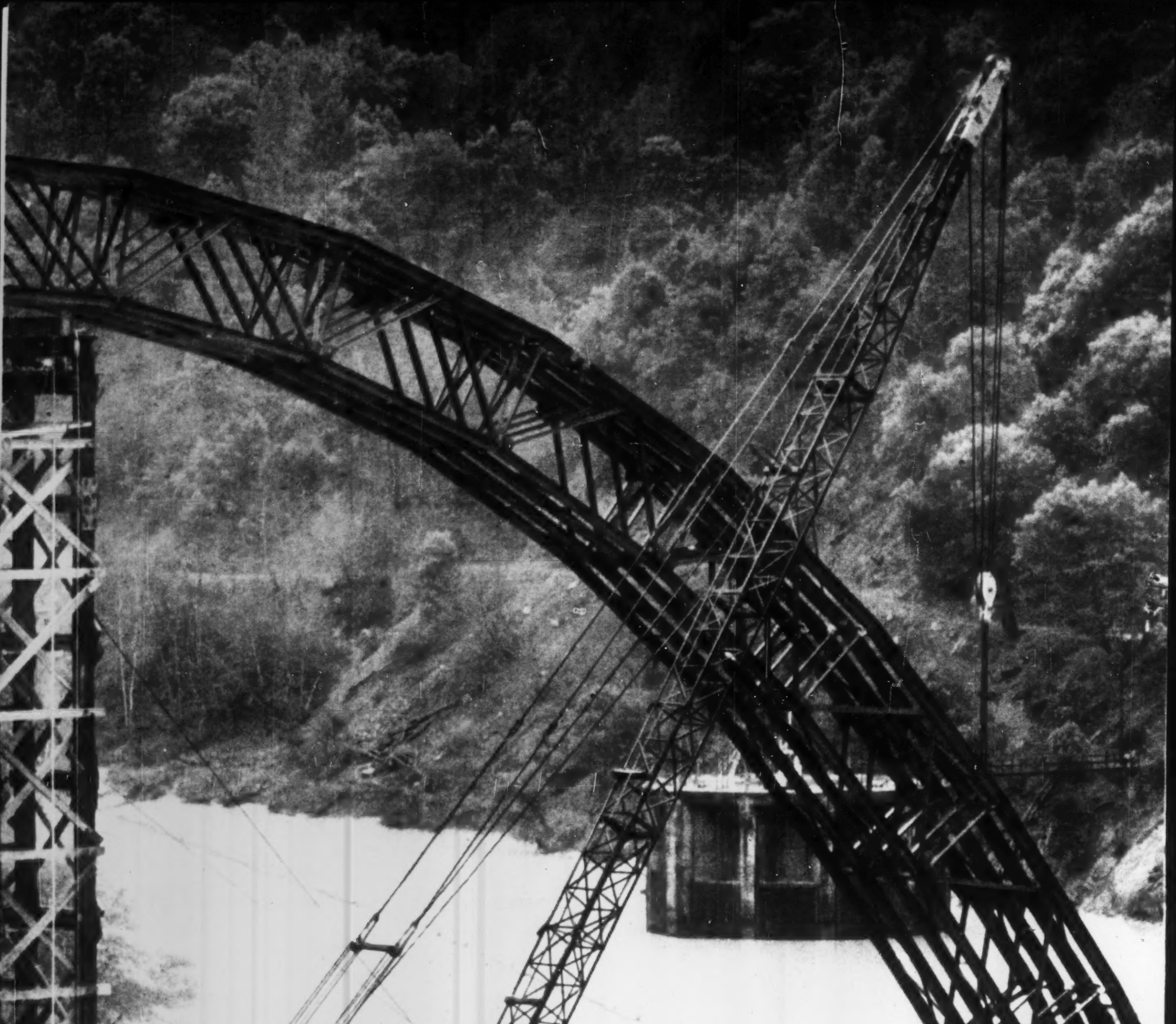
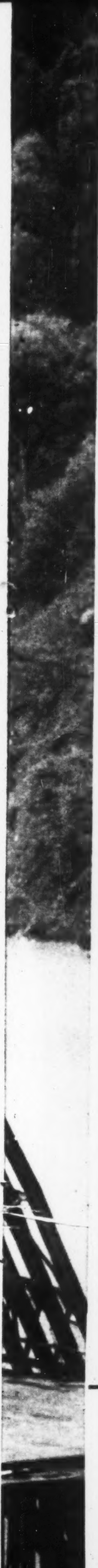


Pacific Bridge Company, Alameda, California, uses a 87½-ton P&H 1055-LC crawler crane to set pre-fabricated steel sections of trestle for the Western Pacific Railroad bridge over Feather River Canyon, north of Oroville, California.



One P&H always sells another because

P&H "PROFIT·LIFTS" accurately set steel hour after hour in the tightest spots

When you estimate a steel erection job today, the man with the best equipment and know-how usually gets the job. Then he depends on his men and machines to bring the job in at a profit.

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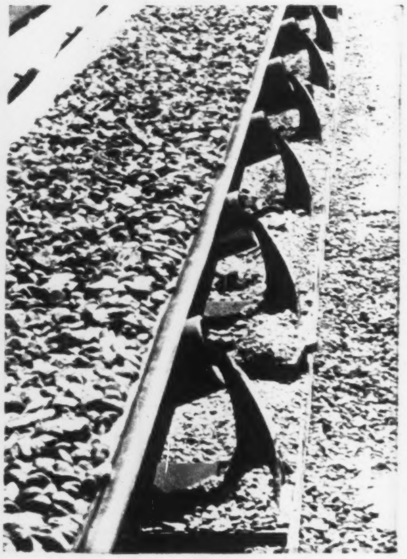

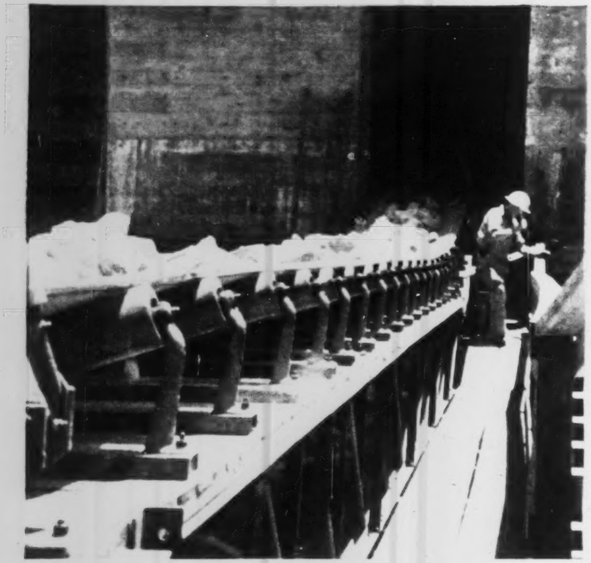

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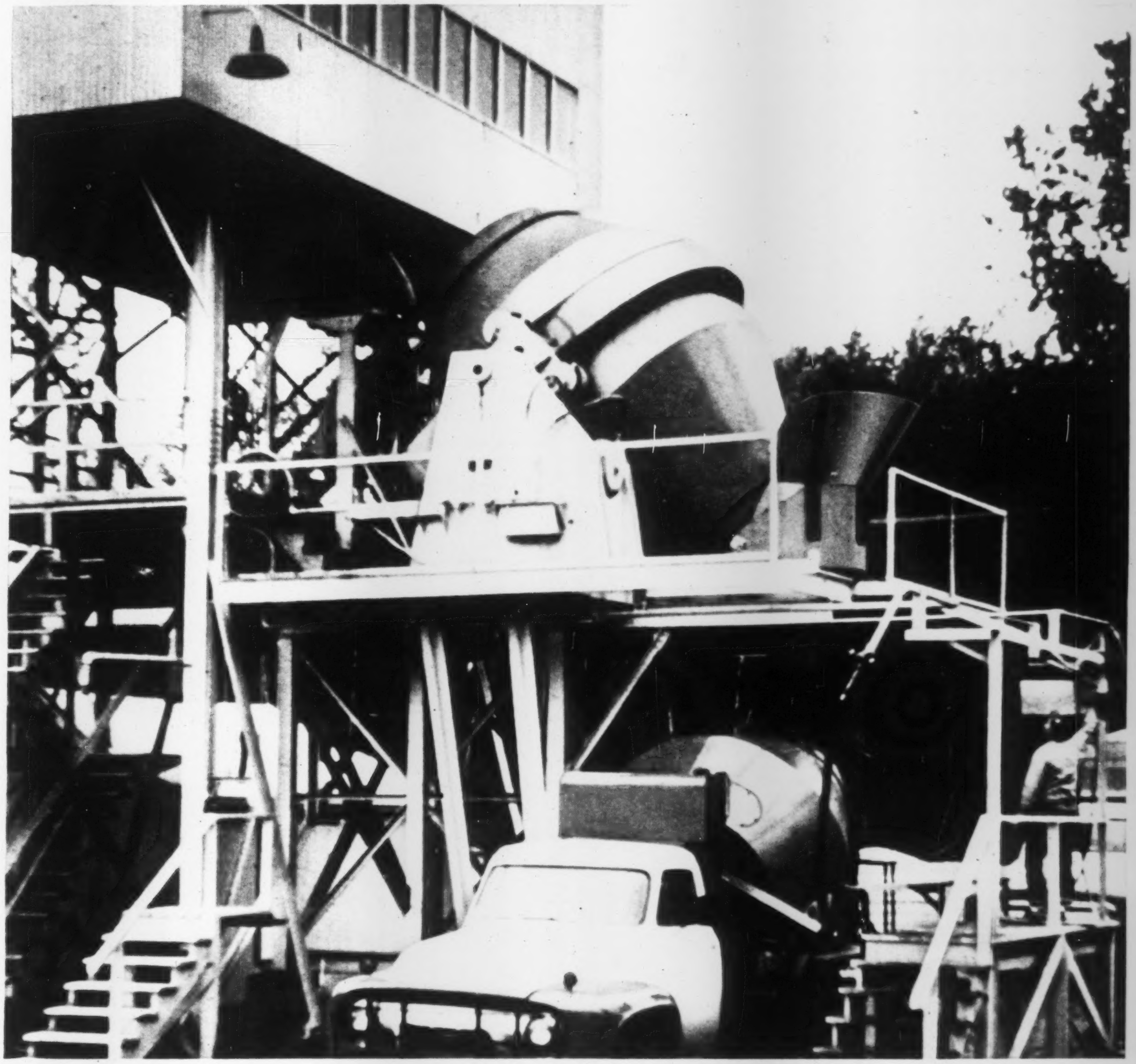

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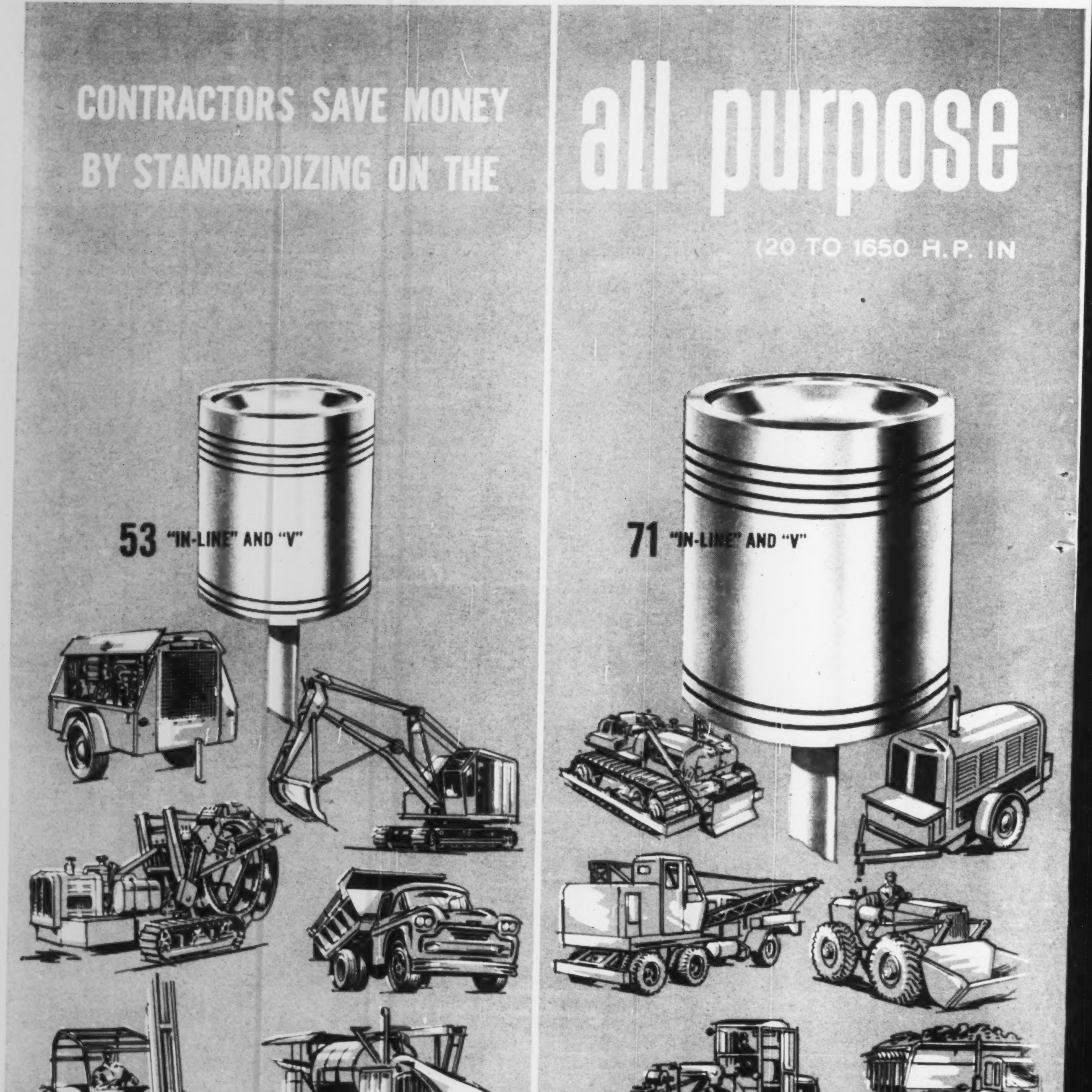
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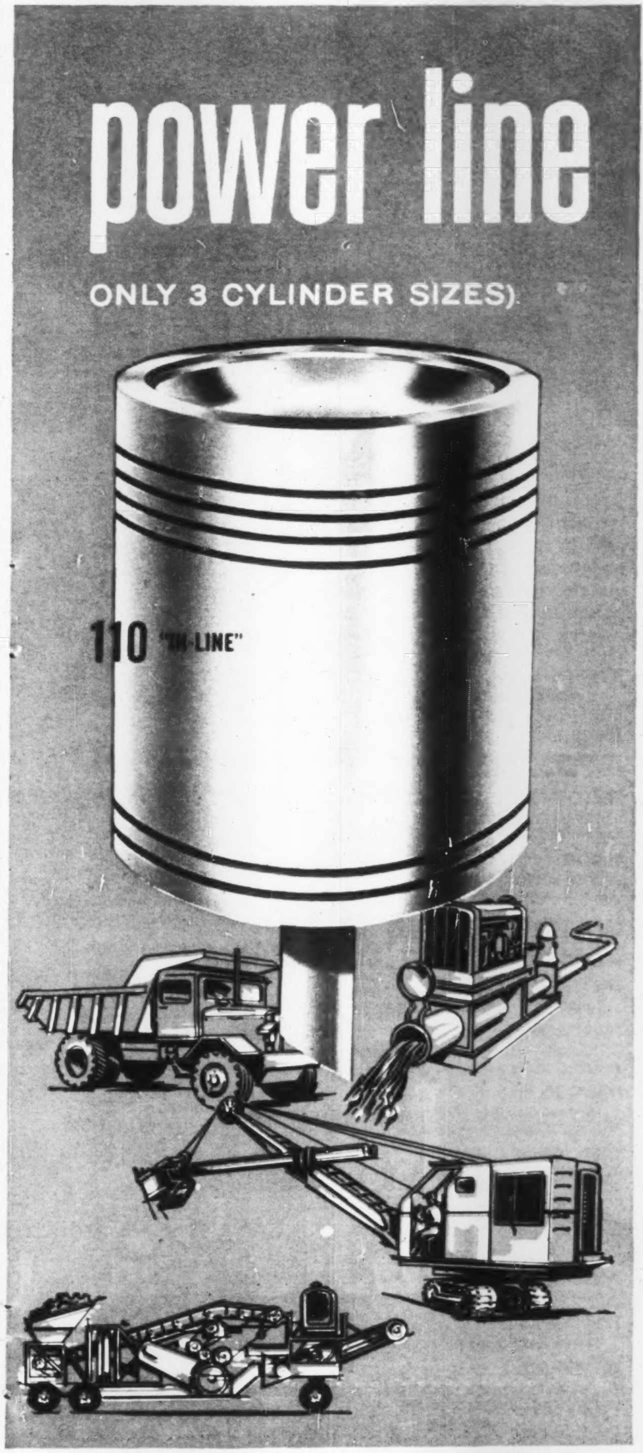
NEW "4-53" 51 to 130 H.P.
"4-71" 69 to 167 H.P.
NEW "6V-53" 76 to 195 H.P.
"6-71" 112 to 252 H.P.



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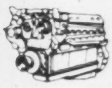
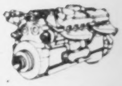
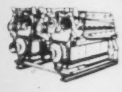
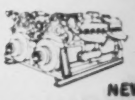
"6-110"
160 to 335 H.P.


NEW
"12V-71"
224 to 504 H.P.


NEW
"16V-71"
300 to 675 H.P.


NEW
"24V-71" (Twin 12)
448 to 1008 H.P.


NEW
"32V-71" (Twin 16)
600 to 1350 H.P.
(Turbocharged—1650 H.P.)

TRETOL INC.

...a new name for excellence

Tretol, Inc. — where imagination and advanced chemical technology combine to produce an exceptional line of products for concrete and masonry construction — offers the architect and engineer an exciting new concept of Concrete Surface Treatments, Concrete Admixtures, and Waterproofing and Dampproofing Compounds. . . . When your design or engineering problem requires ultimate performance and/or physical properties from concrete and masonry, look to **Tretol, Inc.** for the answer. More than a quarter century of experience in the improvement of concrete and masonry construction is at your service.

CONCRETE SURFACE TREATMENTS

FLUAT
. . . a crystal clear liquid chemical hardener to dustproof, wearproof floors and protect against oils, alkalis and salts.

TRETOSCREED
. . . latex cement for resurfacing and repairing concrete floors and surfaces.

TRETOSCALE
. . . controlled surface retarder to expose aggregate for unusual architectural finishes and improved bonding surfaces.

E-POXITE COATING
. . . epoxy base plastic liquid providing extremely adhesive, hard and resiliant surface coating with high abrasion and chemical resistance.

E-POXITE WELD
. . . two-component bonding material with extraordinary adhesive strength for positive welding and bonding of concrete, masonry and other building materials.

E-POXITE PASTE
. . . a high strength epoxy concrete patching material. Sets up into an exceptionally strong and tenacious surface.

TRETOP
. . . armored metallic topping for hardening and coloring of interior concrete.

TRETOSURF
. . . non-metallic aggregate topping for coloring and hardening of interior and exterior surfaces.

TRETOCURE
. . . concrete curing compound for positive curing of all concrete surfaces.

TRETOCURE ARCHITECTURAL CLEAR
. . . virtually water-white curing and sealing compound, formulated especially for fine architectural concrete.

TRETOTRED
. . . plastic, anti-slip material providing non-slip surfaces that are highly chemical and wear resistant. Available in colors.

TRETOCLEVE
. . . concrete bond breaker and membrane sealing compound for clean separation in tilt-up slab and panel construction.

CONCRETE ADMIXTURES

ACTIONATE
. . . multi-purpose liquid admixture to facilitate winter concreting, accelerate set, densify and plasticize concrete, mortar and stucco.

MORTA-MIX
. . . liquid mortar admixture to improve workability and water reduction, reduce capillary action and minimize shrinkage.

HYDROSHIELD
. . . a waterproofing powder or paste admixture for integral protection of mass concrete, stucco and mortar.

AIREBLEN
. . . air entraining agent for positive and efficient control of air entrainment.

TRETOMENT
. . . liquid or powder water reducing admixture that plasticizes and densifies for finer, better concreting.

TRETINT
. . . fine mineral colors in powder form for integral coloring of concrete, mortar and stucco.

WATERPROOFING AND DAMPPROOFING COMPOUNDS

TRETSET
. . . quick setting hydraulic cement for plugging active leaks.

FERROSO W
. . . metallic waterproofer for concrete and masonry walls and surfaces, above and below grade.

FERROSO G
. . . metallic grout to provide sound bearing surfaces for machinery, building column bases, bolts, etc.

TRETOCONE CLEAR
. . . clear silicone water repellent for interior-exterior masonry waterproofing.

TRETOCONE DECRACOAT
. . . latex silicone water repellent coating in beautiful colors, for interior-exterior masonry waterpoofing.

TRETOCALK
. . . excellent calking material for calking, sealing, painting and glazing.

TRETOSHED
. . . bituminous foundation coating for membrane type dampproofing.

TRETOFLEX
. . . an exclusive, new rubberized foundation coating in mastic and semi-mastic consistencies.

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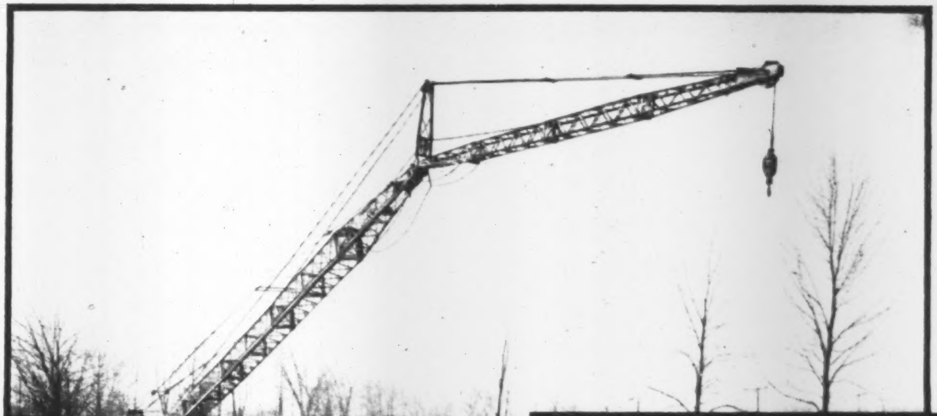
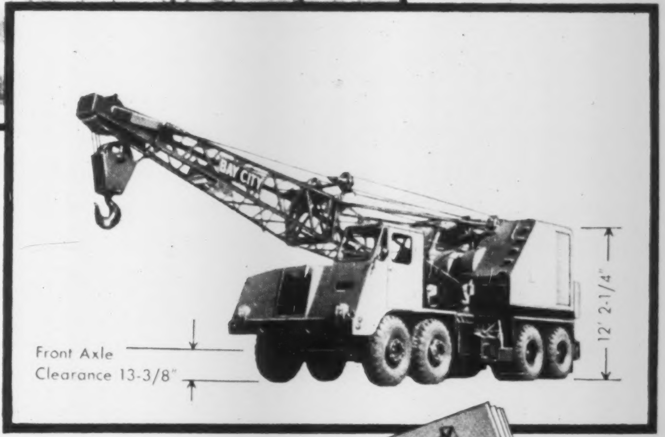
TRETOL, INC. • 6531 WEST 63RD STREET., CHICAGO 38, ILLINOIS

LIFT YOUR PROFITS WITH THE NEW BAY CITY 40 TON CRANEMOBILE®



◀ 40 Ton, 8 wheel CraneMobile raises maximum boom and jib . . . without assistance.



The new BAY CITY 8 wheel CraneMobile has been designed and built for heavy-duty service, convenience and safety . . . economy and ease-of-operation . . . for greatest stability and best load distribution. It has a nominal crane rating of 40 tons at 12 foot radius with 40 foot boom over side or end with outriggers set. The long wheel base gives outstanding roadability, the big engine has plenty of power for off-the-road service or highway travel at selective speeds. Vehicle weight may be readily stripped down to 17,270 lbs. per rear axle and 13,120 lbs. per front axle. Overhead clearance height only 12' 2¼".

NEW 3¾% FINANCE PLAN FOR YOU . . .

BAY CITY now offers a new low-cost, 3¾% financing plan that makes it easy to put Performance Proved BAY CITY equipment to work for you. Monthly payments up to 3 years on crawler machines, 5 years on rubber tire mounted machines. See your BAY CITY dealer, or write for details.

A NEW 40 TON CRANEMOBILE CATALOG that gives complete information on design features and construction of this new eight wheel carrier, is available now. It's free. Send for it today.

BAY CITY CRANEMOBILE

BAY CITY

THE WORLD'S BEST BUILT SHOVELS AND CRANES

BAY CITY SHOVELS INC., BAY CITY 1, MICHIGAN

283

CIRCLE B-4 READER SERVICE CARD

Payloads keep on the move with this Huber-Warco grader clearing the way.

Bruns uses H-W Graders

When Bruns Coal Company, a highway contractor of Zanesville, Ohio, got the contract for a six-mile section of the new Ohio Freeway, they put two of their Huber-Warco graders on the job.

The Bruns contract is for a portion of the new road that will link Cincinnati and Conneaut, Ohio. This highway has been designated as Ohio State Route 1, and will be a vital link in the nation's system of federal roads.

A total of two million yards of dirt will have to be moved on this project before the completion date of August, 1959. A Huber-Warco 5D-190 and a 4D-115 are constantly busy keeping the haul roads clear, and trucks on time.

One big cut in this section is 40 feet deep and 2,000 feet long. The largest fill is 70 feet deep and extends 1,000 feet on each side of a bridge over Conneaut Creek. Bruns will also handle two and one-quarter miles of ramps and interchanges.

A six-inch gravel base will be applied to help the drainage of water from under the road. The concrete pavement will be poured to a ten-inch depth. The dual lanes of this highway will be 24 feet wide, separated by a 54 foot median. Each lane will have five foot stabilized shoulders.

Bruns makes sure that their equipment is always in top shape to deliver the most work. To minimize downtime on the job, all equipment is serviced between the two 10-hour shifts. On this job they are working a six-day week.

• •

Huber-Warco Company

CIRCLE B-5 READER SERVICE CARD

Huber-Warco on the job

"We own four Huber-Warco graders and know from experience that they are tough machines. We can depend on them for all types of grading work."

Lloyd Bruns, Vice President
Bruns Coal Company

Whatever the grading assignment, Huber-Warco motor graders work harder and faster.

on Ohio job

When asked for his comments on the Huber-Warco 5D-190, Edgar Matheney, the operator stated,"It's the best grader I've seen for haul roads. The torque converter and power-shift transmission really let the machine move dirt fast." He continued,"Its extra length and weight make it very good on bank sloping. It's sure dependable."

Why not investigate the merits of a Huber-Warco motor grader for your construction jobs. The BONUS features of Huber-Warco graders give you more machine for the money . . . . more work done faster . . . . and dependability.

Terms up to 36 months and rentals available . . . contact your Huber-Warco distributor.

HUBER
W
WARCO

TANDEM ROLLERS
MOTOR GRADERS
MAINTAINER
3-WHEEL ROLLERS

The Hand with the
Golden Touch
uses A.W.Faber-CASTELL
with BLACK GOLD
Graphite

A.W.FABER CASTELL
PENCIL CO. INC
2H
9000
GERMANY
CASTELL USA LOCKTITE TEL-A-GRADE 9800SG
H

Whether you are an engineer, architect, designer or draftsman, two things are essential for your success:

1. *The native ability to create or interpret.*
2. *The "golden touch" to transform your grey matter into black matter on paper or cloth.*

CASTELL can neither add nor subtract from your native ability, but it can impart the "golden touch" to your eager, sensitive fingers. It gives correct tonal value to every line and shape your brain transmits to your hand.

Made of the world's finest natural graphite, CASTELL tests out at more than 99% pure carbon. Contains no smudgy foreign substance to give the false illusion of black.

Let CASTELL be your perfect "transfer" agent. It costs no more to work with the world's finest drawing tools—CASTELL wood pencils in 20 superb degrees, 8B to 10H, imported CASTELL leads and new functional design LOCKTITE TEL-A-GRADE holders with the bulldog grip clutch. Order from your dealer today.

Choose from: #**9000** CASTELL Pencil. #**9007** CASTELL with Eraser. #**9800SG** LOCKTITE TEL-A-GRADE Holder with new functional spiral grip and degree indicating device. #**9030** CASTELL Refill Lead matching #9000 pencil in quality and grading, packed in reusable plastic tube with gold cap. Other styles and colors of pencils, holders and refill leads.

Castell Leads and Pencils draw on all surfaces, including Mylar-based polyester drafting films. Give perfect lines, easy to erase —excellent reproduction.

BACKED BY NEARLY 200 YEARS UNINTERRUPTED
MANUFACTURING EXPERIENCE — SINCE 1761

A.W.FABER CASTELL DRAWING REFILL LEAD 9030

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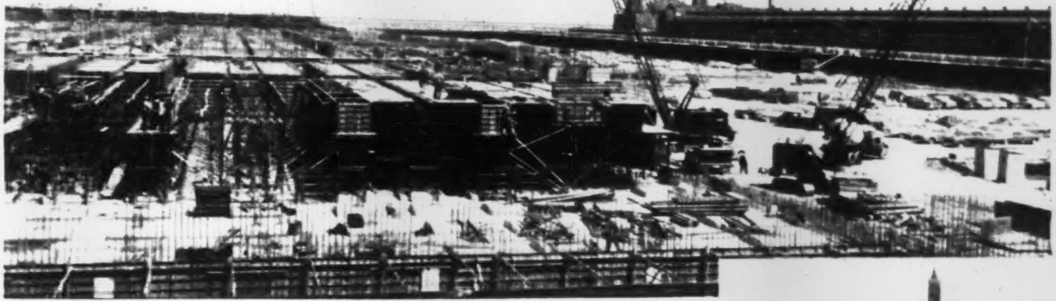
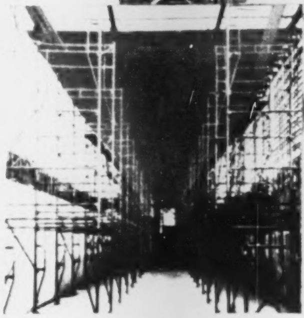
A.W.FABER-CASTELL Pencil Co., Inc.
Newark 3, N. J.

ADVANCE Scaffold cuts labor costs . . . on world's largest filtration plant



When completed, Chicago's Central District Filtration Plant will provide filtered water to about 3,000,000 people in the northern section of the city. Total cost, including connecting tunnels will approximate $95 million. The ADVANCE Scaffold used on the project was furnished by Riverside Sales Contractors Equipment, Inc., Brookfield, Illinois.

Carpenters are preparing to lay stringers and plywood panels on ADVANCE Scaffold shoring towers prior to a pour.



ADVANCE shoring in place for Filter Sub-Structure.

When it comes to making a profit on low-bid narrow-margin jobs, the equipment used and the engineering service behind it can well mean the difference between profit and loss. That's why it's essential to select building construction tools that are designed for fast, dependable, economical production . . . tools that will handle any job that comes along on a high output level regardless of time schedules.

Such was the problem facing the Gust K. Newberg Construction Company in their work on Chicago's $95 million Central District Filtration Plant. The structure, largest of its kind in the world, is a complicated maze of walls, conduits and pipe galleries that consumed in excess of 100,000 cubic yards of concrete in the making. The 562,000 square feet of slab area was supported for shoring with towers of standard ADVANCE Scaffold panels erected to the exacting specifications of the Chicago Department of Public Works. The contractor could ill afford error in computing requirements for materials and man power.

Newberg officials kept close watch on the cost of labor for erecting the shoring scaffold. Their figures showed that 2 carpenters and 1 laborer could erect a scaffold tower 3 panels high, with jacks in place, every 12 minutes. Computed against the hourly scale of carpenters and laborers, Newberg's cost was less than 3 cents per square foot of slab area . . . upwards to 50 percent less than the average cost for this type of work.

Similar high efficiency at low cost is characteristic of construction jobs everywhere that are using the ADVANCE Scaffold system. Check with any contractor-user, or contact BEAVER-ADVANCE for complete information that will help you cut scaffolding and shoring costs on coming work.

Beaver-Advance CORP. — *Ellwood City, Pennsylvania*

BEAVER ADVANCE

SIGN OF QUALITY-VALUE-SERVICE

Send for this descriptive catalog, it's FREE!

BEAVER-ADVANCE CORPORATION., ELLWOOD CITY, PA.

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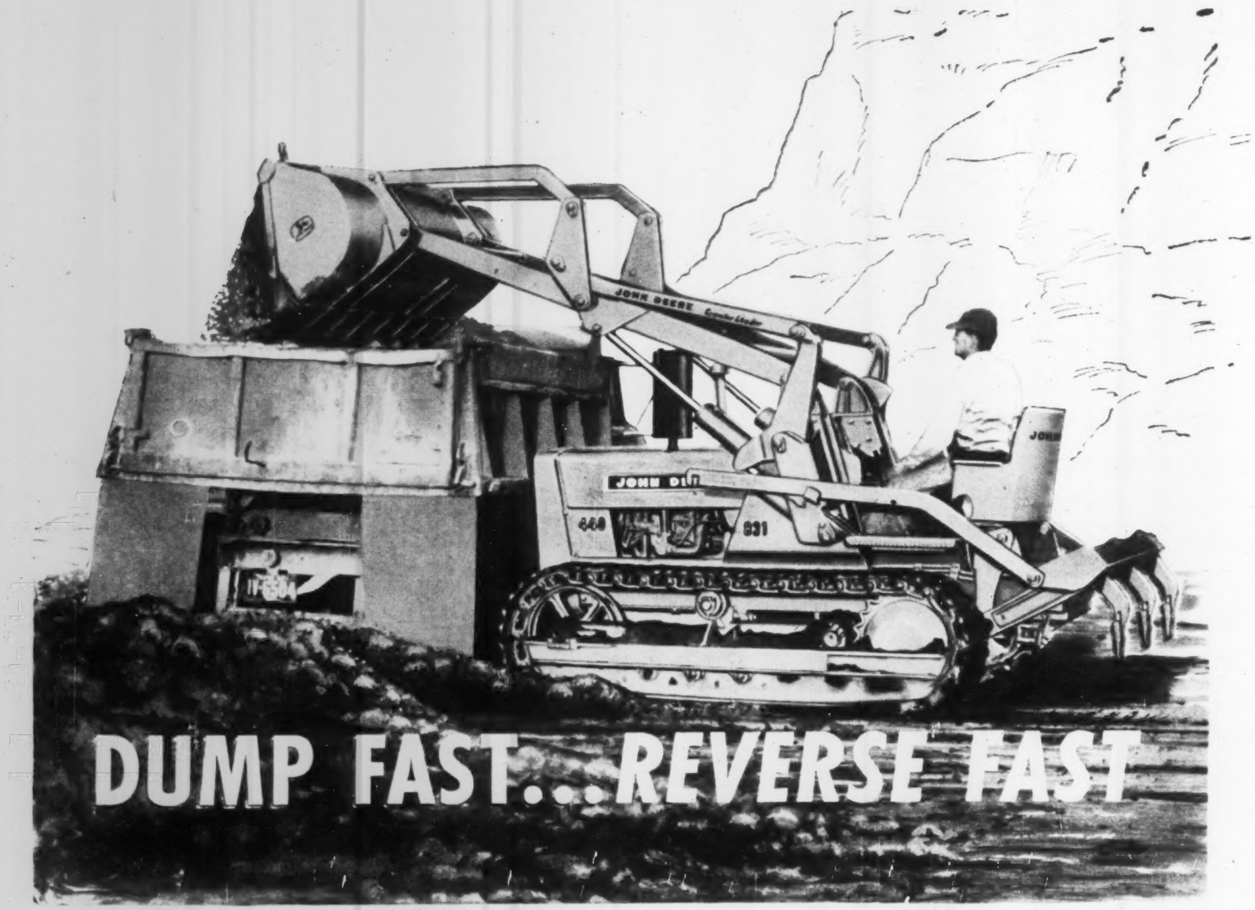


Speed up that job with a JOHN DEERE CRAWLER-LOADER

Here's why you get efficient work and top handling ease with a John Deere Crawler-Loader. After bucket is dumped at full height position, operator can return it to digging angle by use of boom-control only. And there's no need to shift gears to back away from the truck and head for the spoilheap—the clutch-type direction reverser takes care of that. Clutch-control steering adds to the unit's unmatched maneuverability.

Both Diesel and gasoline units are available, each with a new heavy-duty transmission and new working speeds to give you most efficient use of this low-cost power.

See your John Deere Industrial dealer for a demonstration—discover for yourself why this loader gives you top work-capacity per dollar.

Basic Facts on the 831 Loader

Bucket Capacity....	7/8 Yard, Heaped
Roll-Back........	35 Degrees
Pry-Out Pressure ..	8500 Pounds
Dumping Clearance .	7 Feet, 10 Inches
Dumping Angle at Full Height.....	50 Degrees
Engine Options....	Gasoline or Diesel

More facts? Write:
John Deere Industrial Division,
Dept. 543, Moline, Ill.

JOHN DEERE

"Specialists in Low-Cost Power with a Heavyweight Punch"

Reader Comment

Add These 'Old Timers' to Your List

Editor's Note: In selecting the "old timers" among the 475,900 U. S. contractors (ENR April 30, p. 30), ENR missed some firms that started in business prior to January 1, 1918. Their names are listed below. To those who should have made our original list, we extend apologies and congratulations. ENR, which was established in 1874, is pleased to discover so many more firms in our generation. (For a revision of the list of "top contractors," published in the same issue, see p. 30.)

Sir—The list is probably long of contractors whose names were overlooked in your recent article on the oldest firms in the business (ENR, April 30, p. 30).

While we do not do the business that most of those listed in your article do, we have a long list of satisfied clients. We were incorporated in 1905.

Robert V. Cullinan
Treasurer
F. W. Cunningham & Sons
Portland, Me.

▶ Although we are in the "sticks" of Port Chester, this firm has been in construction business for 50 years.

We recently completed a residence in Washington, D. C., for Mrs. Marjorie Merriweather Post May (famed hostess and Post Toasties heiress) which ran close to $3 million. We also have under construction at this time a plant for Chesebrough-Pond's, Inc. in Clinton, Conn., which will total $2.5 million.

We wonder if the above is worthwhile noting.

Philip J. Mezzullo
Marcello Mezzullo, Inc.
Port Chester, N. Y.

▶ I am sure you will be pleased to know that another one of your subscribers—The Dwight Building Co.—is old enough to join the group of "Old Timers". We started our business career in February 1917

G. Vincent Maconi
President
The Dwight Building Co.
Hamden, Conn.

▶ While we do not come near making the first list (top contractors) we should have been listed in the second group, since this company was founded in 1891 within one-half block of the present location.

While our greatest claim to fame rests in the construction of many of the finest country estates and $250,000 homes, the real key to success, beyond the axiomatic musts, has been diversification. We are prepared to undertake any type of work available.

Ralph D. Howell
E. W. Howell Co.
New Canaan, Conn.

▶ I can appreciate that collecting such an imposing list and having it fully complete would be impossible. I would, however, like to point out that the W. J. Barney Corp. was founded in 1917 and has been actively engaged in building construction in New York City and the surrounding areas since that time. In fact, the company's original slogan was "Speed with Economy" and in recent years we have modified this a little by making it "Speed with Economy since 1917."

Wm. Joshua Barney, Jr.
Executive Vice President
W. J. Barney Corp.
New York, N. Y.

▶ For some time, we have speculated upon the number of companies in the construction industry which have been in the business longer than ourselves.

Robert M. Hoover
President
Kansas City Bridge Co.
Kansas City, Mo.

Editor's Note: Mr. Hoover's letterhead indicates his company was established in 1893.

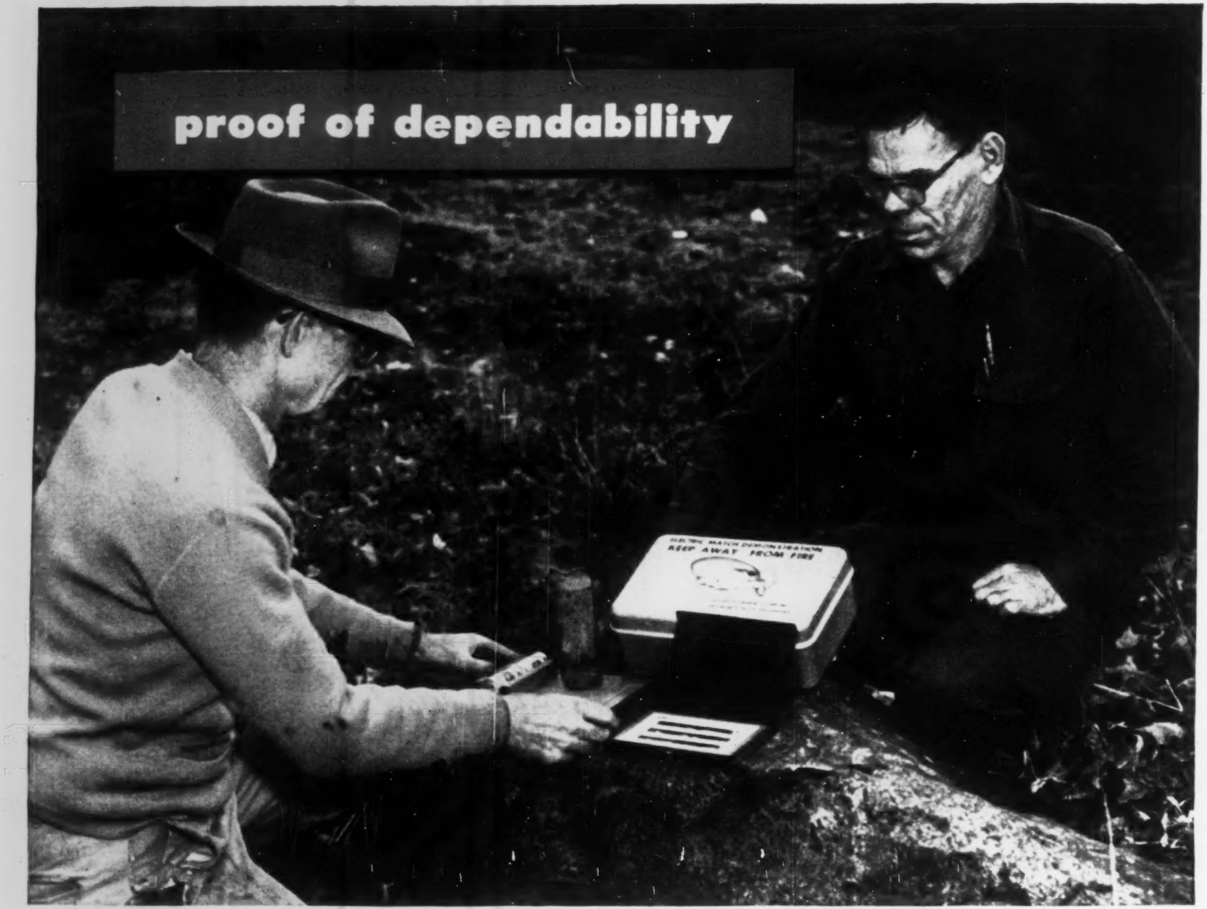
▶ Our company was founded in New York on April 23, 1854—thus making us the 11th oldest contracting firm in the nation (you have a Canadian company listed for 1848)—you will understand our chagrin at being omitted.

A. Schaeffer, Jr.,
Vermilya-Brown Co.,
New York, N. Y.

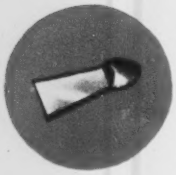
▶ We were surprised that you did not include The P. J. Carlin Construction

. . . 41 More Construction 'Old Timers'

1852—P. J. Carlin Construction Co., Long Island City, N. Y.
1854—Vermilya-Brown Co., Inc., New York, N. Y.
1857—James McKinney & Son, Albany, N. Y.
1865—John Luther & Sons Co., Rochester, N. Y.
1873—Gilbane Building Co., Providence, R. I.
1878—A. Teichert & Son, Inc., Sacramento, Calif.
1879—John Thatcher & Son, Brooklyn, N. Y.
1880—Brann and Stuart Co., Inc., Trenton, N. J.
1889—Ferguson & Edmonson Co., Pittsburgh, Pa.
1890—J. H. Findorff & Son Inc., Madison, Wis.
1890—Hardaway Contracting Co., Columbus, Ga.
1891—E. W. Howell Co., Babylon, N. Y.
1893—Chas. V. Maescher & Co., Inc., Cincinnati, Ohio
1893—Kansas City Bridge Co., Kansas City, Mo.
1894—John E. Healy & Sons, Inc., Wilmington, Del.
1895—White Construction Co., Inc., New York, N. Y.
1897—Cuyahoga Wrecking Co., Cleveland, Ohio
1898—Herman Gundlach, Inc., Houghton, Mich.
1898—Haas & Haynie Corp., San Francisco, Calif.
1898—Younglove Construction Co., Sioux City, Iowa
1902—The Foundation Co., New York, N. Y.
1904—David Goldberg & Sons, Uniontown, Pa.
1904—Franklin Contracting Co., Little Falls, N. J.
1904—Newport Construction Co., Portland, Ore.
1905—F. W. Cunningham & Sons, Portland, Maine
1905—The Rust Engineering Co., Pittsburgh, Pa.
1906—Baton Construction Corp., Philadelphia, Pa.
1908—Fiske-Carter Construction Co., Spartanburg, S. C.
1908—Larson-Danielson Co., Inc., LaPorte, Ind.
1909—Marcello Mezzullo, Inc., Port Chester, N. Y.
1909—Whiting-Turner Contracting Co., Inc., Baltimore, Md.
1912—Henry C. Beck Co., Dallas, Tex.
1912—Sam Finley, Inc., Atlanta, Ga.
1912—Klug & Smith Co., Milwaukee, Wis.
1912—Mark K. Wilson Co., Chattanooga, Tenn.
1913—W. A. Klinger, Inc., Sioux City, Iowa
1914—Southern New England Contracting Co., Hartford, Conn.
1915—E. V. William Co., Inc., Norfolk, Va.
1916—Metzger Construction Corp., Buffalo, N. Y.
1917—W. J. Barney Corp., New York, N. Y.
1917—The Dwight Building Co., Hamden, Conn.



See this Demonstration!



Your Atlas Representative Can Show You Actual Performance of Unique Electric Match Contained Only in Atlas E.B. Caps

All Atlas Electric Blasting Caps are fired with tiny electric matches so dependable that the armed services use thousands of them in missiles and rockets.

You can prove for yourself how sure-fire Atlas caps really are. Your Atlas representative has an interesting test firing kit to show you. Pick a match at random from his stock and fire it yourself . . . see how it can be depended on to fire in your blast hole.

Your Atlas man can show you *why*, too. Every part of every Atlas match is pre-tested, and the match is completed by multiple dips in high quality flash compounds.

Your Atlas representative will be glad to show you this demonstration, and to help you use Rockmaster and regular Atlas E.B. Caps for dependable initiation and timing to get effective, economical blasting.

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POWDER COMPANY
WILMINGTON 99, DELAWARE
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Write for your copy of the new 60-page Handbook of Electric Blasting by D. M. McFarland and Guy F. Rolland.

...a 'plus' with every pass

DOES YOUR JOB REQUIRE A 26 YARD UNIT?

CURTISS-WRIGHT MODEL

226

CW-226 SELF-PROPELLED SCRAPER

Capacities: 26 cu. yds. struck, 36 cu. yds. heaped, 78,000 pound rated load

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at your
CURTISS-WRIGHT DISTRIBUTOR

Have you a big-yardage project coming up? . . . If you do, your job needs the self-propelled, 26 yd. struck, 36 yd. heaped CW-226 — the high production unit that carries more yards per load, more loads per hour . . . The CW-226 is a high production unit designed to handle large yardage projects, and give a bonus with every pass . . . Throughout the entire line of Curtiss-Wright 'plus-yardage' scrapers, unit construction, Roto-Gear steer, constant live winch and positive roll-out ejection make the difference . . . Make the difference pay off. These features make Curtiss-Wright the leader in the construction field today.

SOUTH BEND DIV. CURTISS-WRIGHT CORPORATION, SOUTH BEND, INDIANA

SOUTH BEND DIVISION
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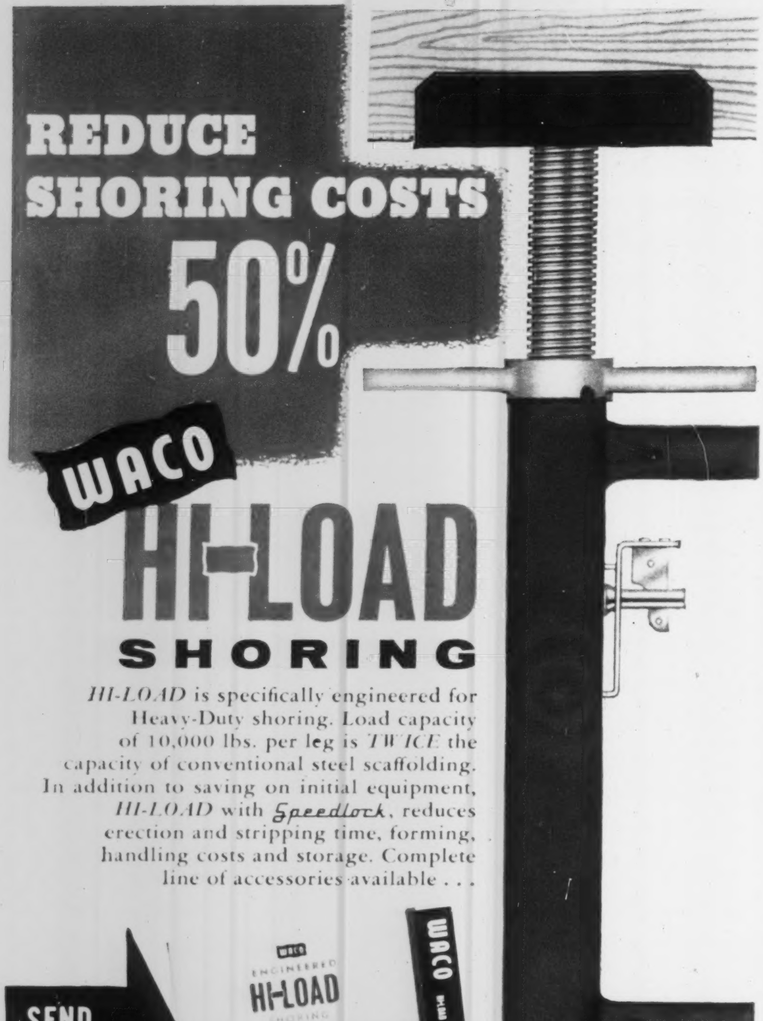
SOUTH BEND, INDIANA

CIRCLE C-3 READER SERVICE CARD



REDUCE SHORING COSTS 50%

WACO HI-LOAD SHORING

HI-LOAD is specifically engineered for Heavy-Duty shoring. Load capacity of 10,000 lbs. per leg is *TWICE* the capacity of conventional steel scaffolding. In addition to saving on initial equipment, *HI-LOAD* with *Speedlock*, reduces erection and stripping time, forming, handling costs and storage. Complete line of accessories available . . .

SEND TODAY FOR COMPLETE STORY

A Complete Line of Shoring Equipment to any required height

POST SHORES Wide Range, 6′ to 15′6″. Patented Speedset adjustment. Head styles to meet all requirements.

SECTIONAL SCAFFOLDING Patented *Speedlock*, built-in ladders, pivoted cross braces, wide variety of frames and complete accessory line.

WACO Manufacturing Company

5251 West 130th Street Cleveland 30, Ohio

Licensees: Armson Iron Works, Windsor, Ontario
Tubular Structures Corp. of America, Los Angeles, California

CIRCLE C-4 READER SERVICE CARD

Co., which has been engaged in contracting, building and engineering since 1852, when the company was founded by the first Patrick Carlin.

We have now under contract in various stages of completion, including joint ventures and individually held contracts, a total of over $18 million worth of work. This work consists mainly of power plants, tunnels and hospital buildings.

EDWARD E. LUSTBADER, P. E.
Vice President
The P. J. Carlin Const. Co.
Long Island City, N. Y.

▶ It would seem to us that a magazine claiming to represent "engineering" should be doubly careful of all articles which are published pertaining to the industry as a whole.

We of the Foundation Co. are proud of the fact that we have been continuously in business since before the turn of the century and that we have been incorporated in the State of New York since 1902.

NEIL O'LEARY
Vice President
The Foundation Co.
New York, N. Y.

▶ We are in the fifth generation of management with no family connections being involved.

ROBERT D. MCGILVRAY
President
Brann & Stuart Co.
Trenton, N. J.

▶ Thinking that these were general contractors we were not disappointed to see our name was not included until we saw little outfits like American Bridge and Bethlehem Steel.

In our small way we furnish structural steel on a direct contract basis as well as subcontracting it, and we feel we should have been included in your list. We were established in 1857.

LAURENCE MCKINNEY
President
James McKinney & Son, Inc.
Albany, N. Y.

▶ We have been in the contracting business in Madison, Wis., since 1890. We feel you have done firms such as ours an injustice by publishing such an incomplete list while at the same time listing some of our competitors.

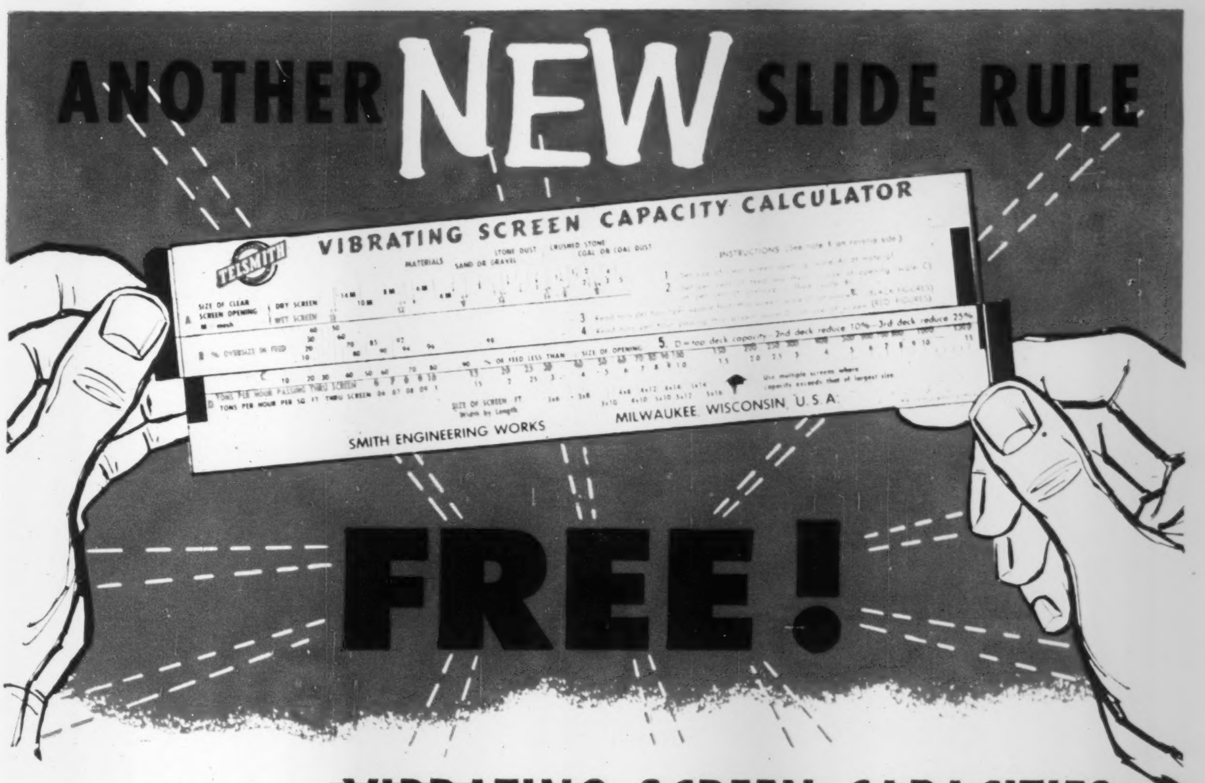
HAROLD HASTINGS
Vice President
J. H. Findoff & Son Inc.
Madison, Wis.

▶ I have reasoned that our omission may be due to the fact that the company's name was slightly changed as it progressed from a single ownership when my grandfather began the business in 1878 under the name of

ADOLPH TEICHERT
Paving Contractor

to a partnership in 1912 when my father joined my grandfather and they

ANOTHER NEW SLIDE RULE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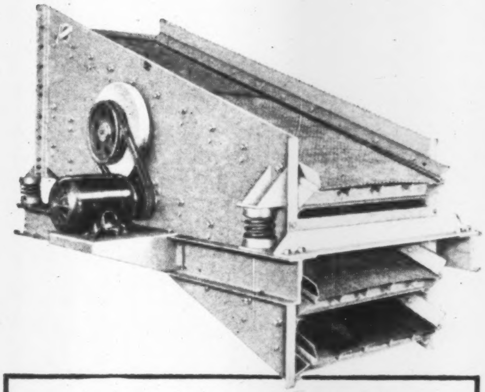
gives you VIBRATING SCREEN CAPACITIES



Another Telsmith first—a handy, compact slide rule with all the factors needed to determine the capacity of any vibrating screen. It takes into consideration—(1) the kind of material to be screened; (2) size of screen openings; (3) percentage of oversize in the feed; (4) percentage of feed less than one-half size of screen openings; (5) whether top, second, or third deck; (6) shape of screen openings; and (7) screen slope. This slide rule gives you, in a few seconds, tons per hour per square foot through screen cloth and capacity of any size of screen. It will help you to pick and buy the most economical size of vibrating screens for your plant or mill.

HOW TO GET YOUR FREE SLIDE RULE

A request for a **Vibrating Screen** Slide Rule addressed to Smith Engineering Works, Milwaukee 1, Wis., on your letterhead, stating your position, will bring you one with Telsmith's compliments.

SRV-559

SMITH ENGINEERING WORKS

500 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • **Cable Address: Sengworks, Milwaukee**

CIRCLE C-5 READER SERVICE CARD CIRCLE C-6 READER SERVICE CARD →

VENEZUELAN JUNGLE KNUCKLES UNDER TO "JUNGLE BUSTERS" BY R. G. LeTOURNEAU, INC.

In Venezuela this "Jungle Buster" is at work clearing virgin land so fertile that corn is 15 feet high 6 weeks after the Crusher makes its first pass!

This amazing 150-Ton Tree Crusher is powered by the Electric Drive System developed by R. G. LeTourneau, Inc.

Instead of wheels, powerful electric gearmotors drive two huge, cleated cylinders to crush the

Log Loader is all-electric. All movements are powered at points of work by electric motors, eliminating transmissions. Fingertip controls allow sensitive, fast log handling without friction clutches.

Pulpwood Transporter picks up, carries, places 35-ton pallets. Electric braking controls machine at exact speed selected . . . has no friction surfaces to wear out. Electric Stacker handles, unloads pallets.

Sno Train built for Army crosses deep Arctic snow carrying 50-ton loads. Tremendous traction of individually powered Electric Wheels and flotation of 10-foot high, low-pressure tires keep it going.

In Last Five Years Electric Drive Conquers Mountains, Deserts and Jungle On Every Continent

For over five years, Electric Drive machines built by R. G. LeTourneau, Inc. have been conquering wilderness areas of the world . . . doing BIG jobs at lower cost and in less time than conventional equipment.

Basic element in their success is the Electric Wheel . . . major component of the System of Electric Power and Control built by R. G. LeTourneau, Inc. When applied to the Tree Crusher, the same high-torque DC motors with gear reductions are mounted inside the drums. This principle has been uniquely successful in the 150-ton and 70-ton Tree Crushers and is now available to the construction industry in a self-powered Sheepsfoot Compactor. This is a 50-ton machine built to comply with federal dam specifications.

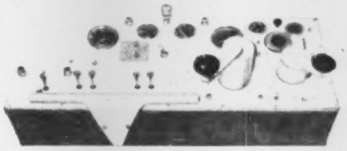
Components of the Power and Control System all were developed — and are manufactured exclusively — by R. G. LeTourneau, Inc. Their dependability — as demonstrated by hundreds of successful applications — has created a new class of heavy duty mobile equipment.

NOW IN EARTHMOVING

Earthmoving machines with electric drive — one of them shown below — have recently been built for the BIG jobs in construction and mining. For information please call or write 2395 South MacArthur, Longview, Texas.

fallen trees pushed over in its path. Matted debris left after the Crusher passes is easily piled or burned.

The Tree Crusher — and other machines in the Jungle Buster team developed by R. G. LeTourneau, Inc. — is at work right now opening up frontiers for agriculture and industry at one-third the cost of conventional clearing operations



LONGVIEW, TEXAS

E 105

STACKER picks up 25 tons of logs in one bite or handles single log with jointed, powered tusks. All movements powered at work points by electric motors and controlled by simple fingertip switches.

GEARS are cut in our own plants for Electric Drive equipment. We make all our own standardized components, including all electric motors, generators and other parts for our System of Electric Power and Control.

ELECTRIC SHEEPSFOOT ROLLER 50 ton electric-drive compactor built to federal dam specifications. Six-foot drums reduce rolling resistance, give feet more thrust. Get details on this M-50, and other machines.

PAYLOADER® versatility

Side Boom and Bucket

Even seasoned contractors are amazed at the number of jobs a "PAYLOADER" tractor-shovel can handle when equipped with the exclusive Superior-Hough side boom attachment. Because the boom is side-mounted, it does not interfere in any way with the use of the bucket — the "PAYLOADER" can work as a shovel and a crane at the same time without losing time making equipment changes.

As a side boom it can set precast manholes, spot heavy equipment, unload and string pipe, pull sheeting, walk and work over pavement and curbs without damage. The hydraulically operated boom telescopes from 10 to 16-ft. in length, lifts 10,000-lbs. at 4-ft. overhang, more than a ton at 14-ft.

As a shovel the "PAYLOADER" has a bucket carry capacity of 9,000-lbs. that can be used to backfill trenches, dig and load excess dirt, clear and grade rights of way, charge hoppers and do many other material handling jobs.

4-wheel-drive "PAYLOADER" tractor-shovels handle easily (power-shift transmission, power-steering), travel fast (up to 24 mph) to work profitably on widely scattered job locations in a single day. A nearby Hough Distributor has complete details — contact him or write!

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
772 Sunnyside Ave., Libertyville, Ill.

Send Side Boom data to:

Name
6-B-2

Title
Company
Address
City
State

. . . Reader Comment

began contracting under the name of

A. TEICHERT & SON

This partnership was one of the first licensed contractors in the State of California, being assigned License No. 8 (which is still our license number), and was awarded the third contract let by the newly formed highway department of California in 1913.

Then, in 1927, the company was incorporated in the State of California under the name of

A. TEICHERT & SON, INC.

HENRY TEICHERT
President
A. Teichert & Son Inc.,
Sacramento, Calif.

▶ Both lists were undoubtedly very difficult to compile and hence they probably have omissions. For instance, W. A. Klinger, Inc. has been in business constantly since 1913, in Wisconsin from 1913 to 1918 and in Iowa since that time. Volume now totals $8 million to $10 million per year.

Younglove Construction Co. has been in the business of building grain elevators and feed mills since 1898. It is now headed by the third generation, Roger F. Younglove. A separate corporation, it is now a subsidiary of W. A. Klinger, Inc. It has a volume of approximately $3 million per year, made up of jobs averaging about $200,000 each.

W. A. KLINGER
W. A. Klinger, Inc.
Sioux City, Iowa

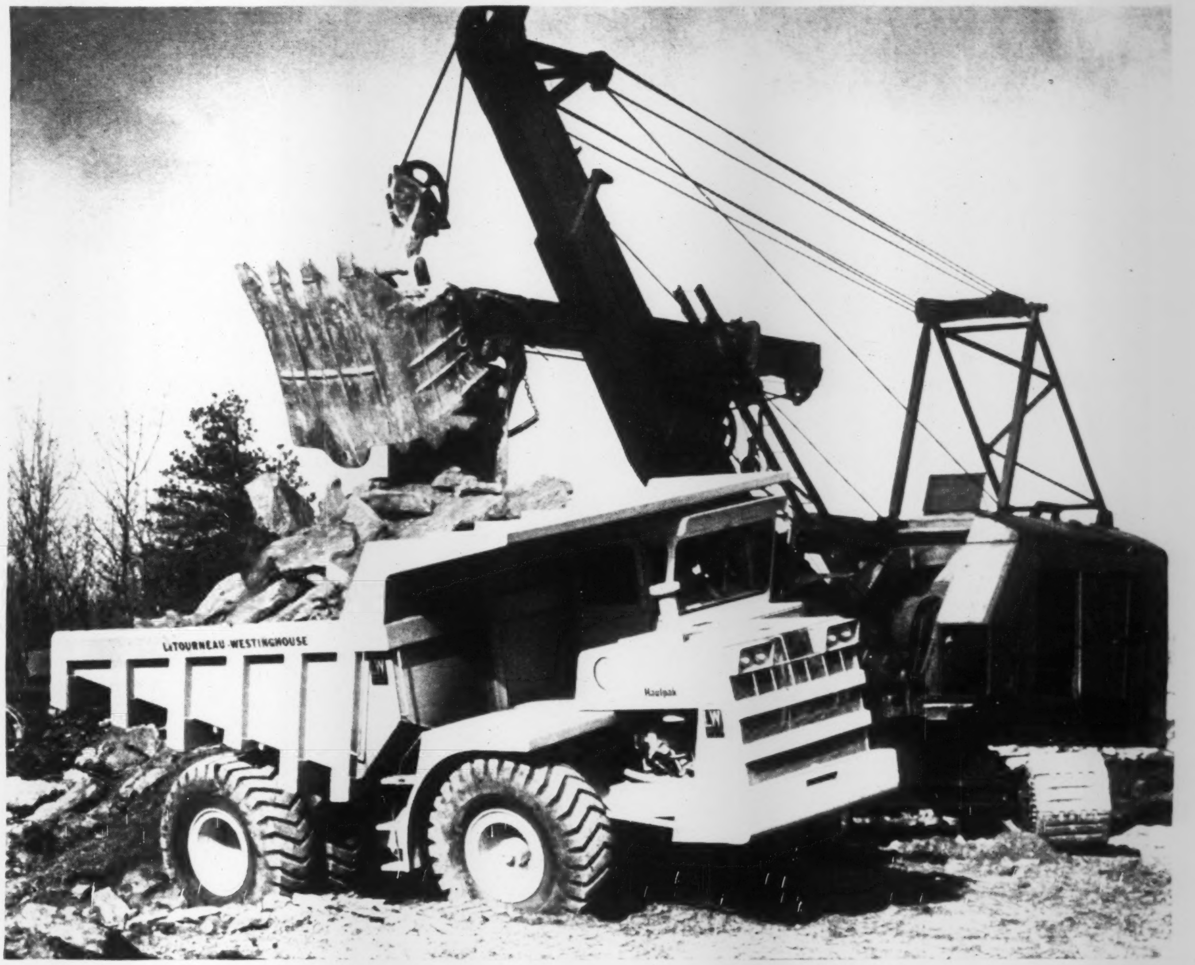
P. S. Incidently, W. A. Klinger is approaching Guy Atkinson in seniority. Like him, he is a past president of the AGC—in fact, preceded Guy by two years. All previously elected presidents have passed to their rewards leaving him in sort of a senior statesman status.

▶ We find many of our contractor friends listed. We agree with you when you say, "Age is becoming an honorable characteristic of many contracting firms." May we join your "Old Timers"? We began work on our first contract, February 22, 1912.

MARK K. WILSON, JR.,
Partner
Mark K. Wilson Co.
Chattanooga, Tenn.

▶ We were established in Buffalo in the year 1916 as Metzger Construction Co. In 1927 we were incorporated and became Metzger Construction Corp. Our

Engineering News-Record welcomes expression of opinion from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.



JOB RECORDS PROVE

Firestones lower tire costs-per-hour!

Firestone off-the-highway tires cut costs by working extra hours on the roughest jobs! That's because they're built with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires. Tough Firestone treads and sidewalls defy cuts from rubble and shale. Exclusive Firestone S/F (Shock-Fortified) nylon bodies shrug off bruising shock and impact. There's a Firestone tread and tire design that is job-engineered for your job requirements. Call your Firestone Dealer or Store and ask about Firestone's full line of tubeless or tubed off-the-highway tires and on-the-job tire service.

Rock Grip Excavator Wide Base · Rock Grip Excavator

When ordering new equipment always specify Firestone tires—available tubeless or tubed.

Firestone

BETTER RUBBER FROM START TO FINISH

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FRANKI FOUNDATIONS
at World's Most Modern Bakery for Biscuits and Crackers

$15 million plant of National Biscuit Company on 40-acre site at Fair Lawn, N. J., 12 miles from George Washington Bridge.

GENERAL CONTRACTOR: Walter Kidde Constructors, Inc., New York, N. Y.

FOUNDATION CONTRACTOR: Franki Foundation Company, New York, N. Y.

164-Foot High Tower Section for Raw Materials Storage and also 2-Story Laboratory Built on Franki Displacement Caissons Bearing in Granular Subsoil.

This newest of 10 Nabisco bakeries and a major unit in a $180 million expansion and modernization program was designed and its construction supervised by the Company's own engineering department.

When borings for the tower section at the north end of the plant showed granular subsoil, Nabisco engineers recognized that displacement caissons with expanded base footings would provide a solid and most economical foundation. The tower is primarily for storage of 75 carloads of raw materials with mixing departments in the lower area.

After Franki engineers completed additional soil tests, two rigs installed 407 Franki Displacement Caissons at depths averaging 20 feet below grade, at a rate of better than 6 per day per rig during 36 driving days of cold December and January weather. Groups of caissons carry column loads as high as 940 tons.

Later, Franki engineers were called in again, this time for the foundations for an adjoining two-story Research and Development Laboratory at the south end of the four-block long bakery. A single rig installed 130 Franki Displacement Caissons in 20 driving days at average driven depths of 21 feet.

These two Nabisco installations, like other Franki work, were quoted on a lump sum basis without qualification or payment for excess footage. All work was guaranteed.

Ask for Literature describing Franki Methods and Typical Installations

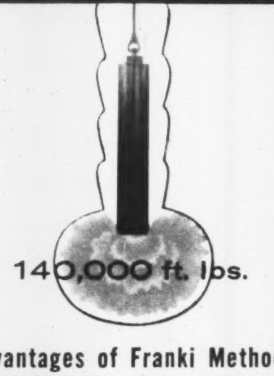
FRANKI FOUNDATION COMPANY

Displacement Caissons · Pressure Injected Footings · Tube Piles · Underpinning · Soil Investigations

103 Park Avenue
NEW YORK 17, N. Y.
MUrray Hill 5-8916

114 South Warren Street
SYRACUSE 2, N. Y.
HArrison 2-0478

Statler Building
BOSTON 16, MASS
HAncock 6-0010



Advantages of Franki Methods

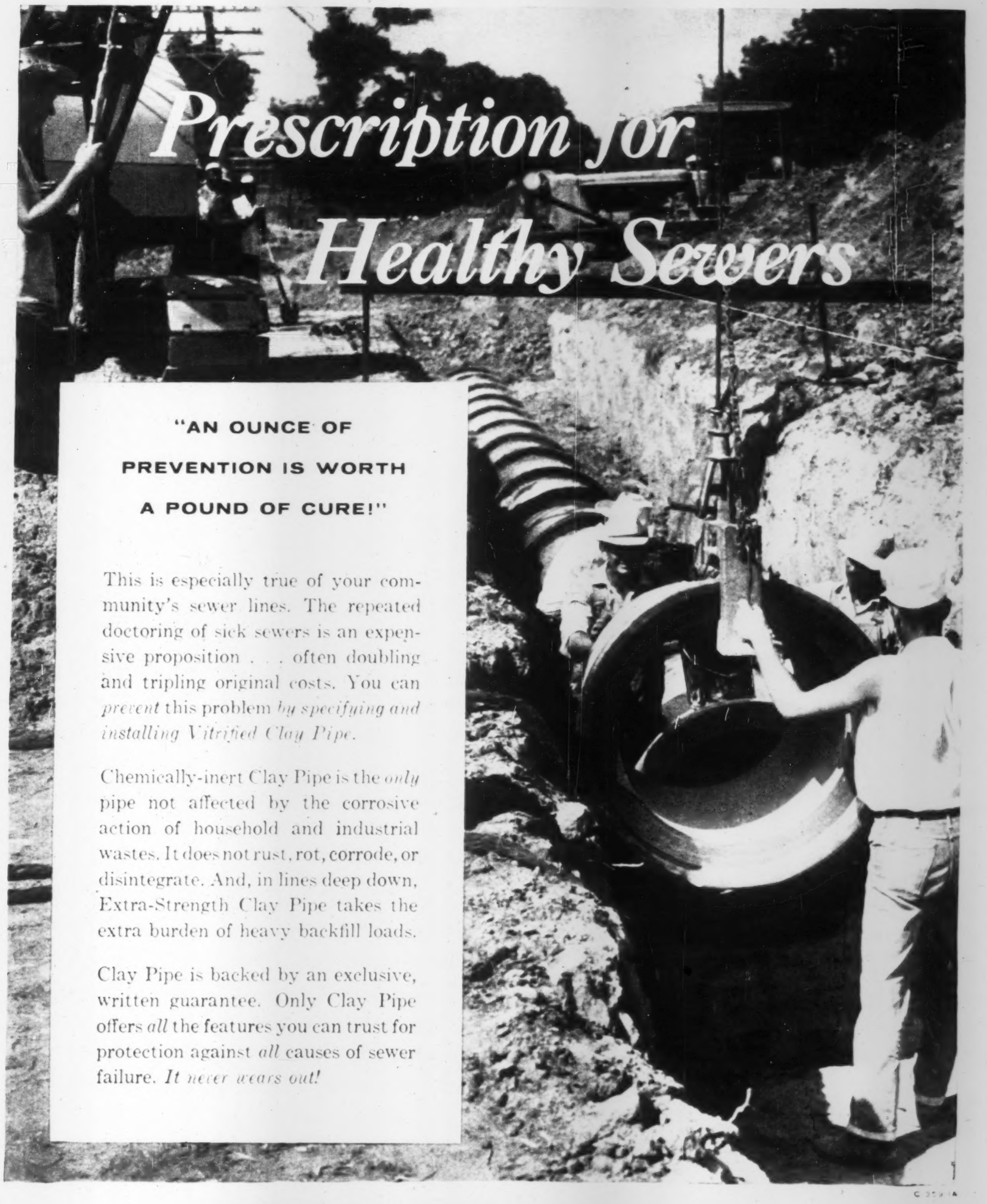
A Franki Displacement Caisson, with its surrounding compacted earth mass, exploits the maximum bearing capacity of the soil.

Every Franki pressure-injected-type footing of "dry"* concrete is "forged" with 140,000 foot-pound blows of a falling ram, a force many times greater than the blow of a steam or pneumatic hammer.

As a result, the advantages are:

1. High unit load capacity due to expanded base made in granular soil.
2. Economy because fewer Franki caissons of shorter length are required.
3. Volume of reinforced concrete caps is reduced to a minimum with corresponding savings in cap excavation, sheeting, reinforcing, forms and backfill.
4. Concreting of shaft can be made at any cutoff elevation below grade. Installation can be made in advance of general excavation with resulting saving in sheeting, bracing and maintenance. Depending on water table elevation, economies in pumping costs may also result.

*"Dry" concrete is defined as zero slump concrete using approximately 3½ gallons of water per bag of cement.



Prescription for Healthy Sewers

"AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE!"

This is especially true of your community's sewer lines. The repeated doctoring of sick sewers is an expensive proposition . . . often doubling and tripling original costs. You can *prevent* this problem *by specifying and installing Vitrified Clay Pipe.*

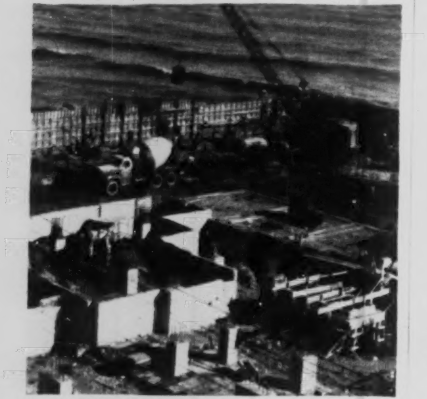
Chemically-inert Clay Pipe is the *only* pipe not affected by the corrosive action of household and industrial wastes. It does not rust, rot, corrode, or disintegrate. And, in lines deep down, Extra-Strength Clay Pipe takes the extra burden of heavy backfill loads.

Clay Pipe is backed by an exclusive, written guarantee. Only Clay Pipe offers *all* the features you can trust for protection against *all* causes of sewer failure. *It never wears out!*

Vitrified **CLAY PIPE** *Never Wears Out*

NATIONAL CLAY PIPE MANUFACTURERS, INC. 1820 N Street, N. W., Washington 6, D.C.
311 High Long Bldg., 5 E. Long St., Columbus 15, Ohio • 703 Ninth & Hill Bldg., Los Angeles 15, California • Box 172, Barrington, Illinois • 1401 Peachtree St., N. E., Atlanta 9, Georgia

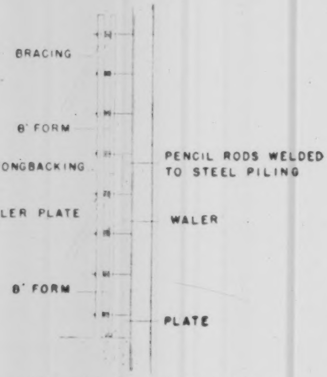
12¢ a Square Foot



Best Method to Pour 750 Ft. Retaining Wall

Symons Forms, Sheet Piling and Pencil Rod Ties

How to pour a 750 foot lake retaining wall with thickness from 12 to 20 inches and 13 ft. high, faster and more economical. S. N. Nielsen Construction Company, Chicago, had that problem on a 600 unit apartment on Lake Michigan shoreline. Since a fixed core could not be obtained while using sheet piling only, the superintendent used Symons Steel-Ply Forms with sheet piling and pencil rods as ties.



Was this method a success? After 250 feet of wall had been formed, poured and stripped, the forming costs were computed at 12 cents a square foot.

Contractors are finding almost as many uses for Symons Forms as there are jobs to bid on. It will pay you to send for our FREE form literature. And Symons Forms can be rented with purchase option.

Symons
SYMONS CLAMP & MFG. CO.
4265 Diversey Ave., Dept. F-9, Chicago 39, Ill.

MORE **SAVINGS** FROM **SYMONS**

CIRCLE D-3 READER SERVICE CARD

operation during the past 43 years has been continuous.

David J. Metzger
Treasurer
Metzger Construction Corp.
Buffalo, N. Y.

▶ Our company has been active in the building industry since 1914. We believe that we are the second oldest contracting firm in continuous operation in the State of Connecticut.

David T. Weinerman
The Southern New England Contracting Co., Hartford, Conn.

▶ We are a general contractor with more than 50 years in the contracting field. We are now in the third generation of Larsons and Danielsons.

We enjoyed your article very much . . . this knowledge adds prestige to our industry. This list you published, plus the additional names you have undoubtedly received, is testimony in itself that our industry is based on *Skill, Integrity* and *Responsibility!*

T. C. Larson
Vice President
Larson-Danielson Construction Co., Inc.
LaPorte, Ind.

Some Views on 'Top Contractors'

Sir—I have read, with much interest, the article giving a list of contractors performing more than $25 million in work in 1958 (ENR Apr. 30, p. 21), and the article listing contractors in business for more than 40 years. I know either by personal contact or by reputation a goodly number of these firms in both lists, and they certainly constitute the top firms in the country.

I believe we should have been included in the list of "old timers" and possibly in the list of having done work totaling more than $25 million. We could have been left out through some oversight of ours or inadvertently.

For the year 1958 Hardaway Contracting Co. did a volume of business totaling $22,139,260, and Sam Finley, Inc. (owned by Hardaway since 1945) a total of $9,229,558, with a combined total of $31,368,818.

B. H. Hardaway
Hardaway Contracting Co.
Columbus, Ga.

▶ The total amount of contracts awarded to Turner Construction Co. should be approximately $117,000,000.

A. R. LeFaucheur
Turner Construction Co.
New York, N. Y.

▶ We have put on our books for the calendar year 1958 a total of $72,022,918, all of which is new business. This figure does not include any carry over from 1957.

Some of these contracts were negotiated, based on an estimated cost, of which the actual cost cannot be determined until the projects are completed.

Buck Mickel
Vice President
Daniel Construction Co.
Greenville, S. C.

▶ Contracts awarded in 1958 to Kaiser Engineers total $65,834,000 in United States only, and $154,271,000 overseas. These figures reflect project values, including both turnkey and construction only jobs. They do not include contracts for engineering only of possible interest. So far this year new contracts on world-wide basis total in excess of ¼ billion dollars.

M. B. Falkell
Kaiser Engineers
Oakland, Calif.

Editor's Note: For Kaiser Engineers Div. in combination with Henry J. Kaiser Co., we reported last year $33,662,000, including a joint venture. In ENR's records, some of this work was reported under Kaiser Engineers, some under Henry J. Kaiser.

▶ Unless consideration is given to the various classifications to determine size, one would know very little about the

The 11 Top Contractors of 1958 (Revised) . . .

(Rated by volume of contracts reported by ENR)

1.	Peter Kiewit Sons' Co., Omaha	$238,287,658*
2.	Merritt-Chapman & Scott Corp., New York City	195,633,525
3.	Diesel Construction Co., Inc., New York City	188,000,000
4.	Morrison-Knudsen Co., Inc., Boise, Idaho	167,054,382*
5.	American Bridge Div., U. S. Steel Corp., Pittsburgh	156,227,755
6.	George A. Fuller Co., New York City	115,244,625*
7.	Turner Construction Co., New York City	98,000,000†
8.	Perini Corp., Framingham, Mass.	87,864,990*
9.	United Engineers & Constructors, Inc., Philadelphia	87,300,000
10.	Ebasco Services, Inc., New York City	85,000,000
11.	S. J. Groves & Sons Co., Minneapolis	75,662,692

* Includes joint ventures † Corrected

PROTECT THE PUBLIC . . .

and You Protect Yourself!

CAUTION
UTION

PROPER LIGHTING of the highway hazard is an essential investment to protect the public, workers, and equipment, and to eliminate potential causes of costly lawsuits.

NEW, BRIGHTER, DIETZ No. 100
CONTRACTOR LANTERN

Now, this improved lantern illuminates exact location, extent and boundaries of hazardous areas more vividly than ever. The only lantern that combines brilliance and long burning. Extra-large fount provides 75 hours of reliable operation.

Use the DIETZ
3-WAY
HAZARD WARNING SYSTEM

Use Dietz Visi-Flash Lights to alert the oncoming driver. Brightest, safest, most trouble-free flashers on the market. Warn: "Danger ahead."

Use Dietz Lanterns to locate hazard in relation to driver's position. Show exact location, shape, extent, and boundaries of hazard area. Burn up to 75 hours.

Use Dietz Torches to guide driver around the hazard. Fully illuminate the danger in every weather. Burn up to 40 hours on low cost kerosene.

SEE YOUR CERTIFIED DIETZ DISTRIBUTOR IN THE U.S.A. OR CANADA

Go DIETZ and you go Safely

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114 Leavenworth Ave., Syracuse, N. Y.

Please send me a copy of the Hazard Warning Lighting Manual.

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TITLE__________
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CITY__________ZONE_____STATE__________

relative position of the major contractors of the country. Also, there is a tendency to introduce into such consideration contractors whose business is widely diversified as to the type of thing they do, such as the Kellogg Co. and others who are really specialists in power plant and refinery construction, and do not have a close parallel to the type of things we do.

I consider this entirely immaterial, as I know of no importance to attach to it, but we should classify on the basis perhaps of capital operative in the business or volume of work completed in a given period, earnings per year and perhaps other factors.

To give you accurate information about our company I am enclosing a copy of our 1958 Annual Report. Certain items undisclosed would substantially increase the total asset position of our company. For instance, our ownership in stocks of other companies outside construction business are carried in the current statement at their cost price to M-K.

As an example of this, there is one item carried at approximately $200,000 as cost is saleable on today's market for in excess of $4 million. We also have large claims growing out of the Seaway and/or other construction projects which are presently pending settlement. These are given no value in this current statement.

Here's a Summary of Complete and Incomplete Contract Volume

(Add 000)

	Parent Company	Domestic Subsidiaries	Foreign Subsidiaries	Total
Uncompleted 1957 Volume Carried Over	$112,942	$40,199	$120,270	$273,411
New Volume Awarded 1958	120,887	53,064	57,848	231,799
Total Volume in Force 1958	233,829	93,263	178,118	505,210
Volume Completed 1958	145,797	59,922	99,552	305,271
Uncompleted Volume Carries Over to 1959	88,032	33,341	78,566	199,939

(Joint ventures entered as M-K proportion only.)

The parent corporation's 1958 construction volume of $145,797,000 was performed under 134 separate contracts in 22 states and territories of the United States and two foreign countries. Of the total number of contracts, 65 were carried over from 1957 as uncompleted projects and 69 were new contracts entered into throughout the year 1958.

Of the parent corporation's total construction volume, $83,699,000 was completed under 72 contracts in which no other construction company participated and $62,098,000 completed as the parent corporation's proportion of 62 contracts in which two or more construction companies participated jointly. Supervisory and working forces of the parent corporation were engaged on 27 of these joint venture contract operations which, together with the 72 of the company's own contracts, brought to a total of 99 the number of contracts operated in 1958 by parent corporation alone.

Under 40 separate contract operations, our principal domestic subsidiary, The H. K. Ferguson Co., completed $43,876,000 of domestic construction in 1958. Of the total $33,341,000 backlog of domestic subsidiaries, $24,437,000 is the backlog of the H. K. Ferguson Co. alone.

H. W. MORRISON
Morrison-Knudsen Co., Inc.
Boise, Idaho

Foreign Aid: Monuments to US?

Sir—The Article "U. S. to Prod Investment Overseas" (ENR Apr. 9, p. 101), contains several points which would be anathema to foreign governments and peoples. One in the Ralph I. Straus report to the State Department would give American operating companies over-all managerial responsibility for surveying, building and initially operating entire industrial projects.

As one who was directly involved in the industrial program as a consultant to the Chinese Government in Taiwan, I have strong feelings against the above principle. One of the objectives of our aid program, and I consider it very important, is the development of the latent abilities of the people in these countries to carry out entire projects themselves. The use of consulting-advisory services to give guidance where needed, and leadership if necessary, but above all compassionate help, will materially assist these people to help themselves, will build confidence in their own capabilities and will help to win their respect and lasting friendship.

Nothing can alienate a people more rapidly and permanently than to come into their country with an aid program in which they have no part, except to struggle later with, in many cases, an unrealistic repayment schedule. My experience with the Chinese in 1955-1957, revealed talents capable of carrying through a complex industrial chemical project with only a minimum of assistance. They were capable of performing engineering studies, preparing of economic analyses, negotiating contracts and actually constructing and erecting plants with local personnel and equipment.

(*Reader Comment continued p. 35*)

MAINTENANCE FREE PRESTRESSED CONCRETE TANKS

- OVER 2000 TANKS IN SERVICE
- NO MAINTENANCE COST
- 75% CONSTRUCTION COST SPENT LOCALLY
- LOWEST OVERALL COST
- PROVEN IN SERVICE
- SATISFIED OWNERS

If you have a water storage problem, call or write for Bulletin T-22.

PRELOAD

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VERSATILE!

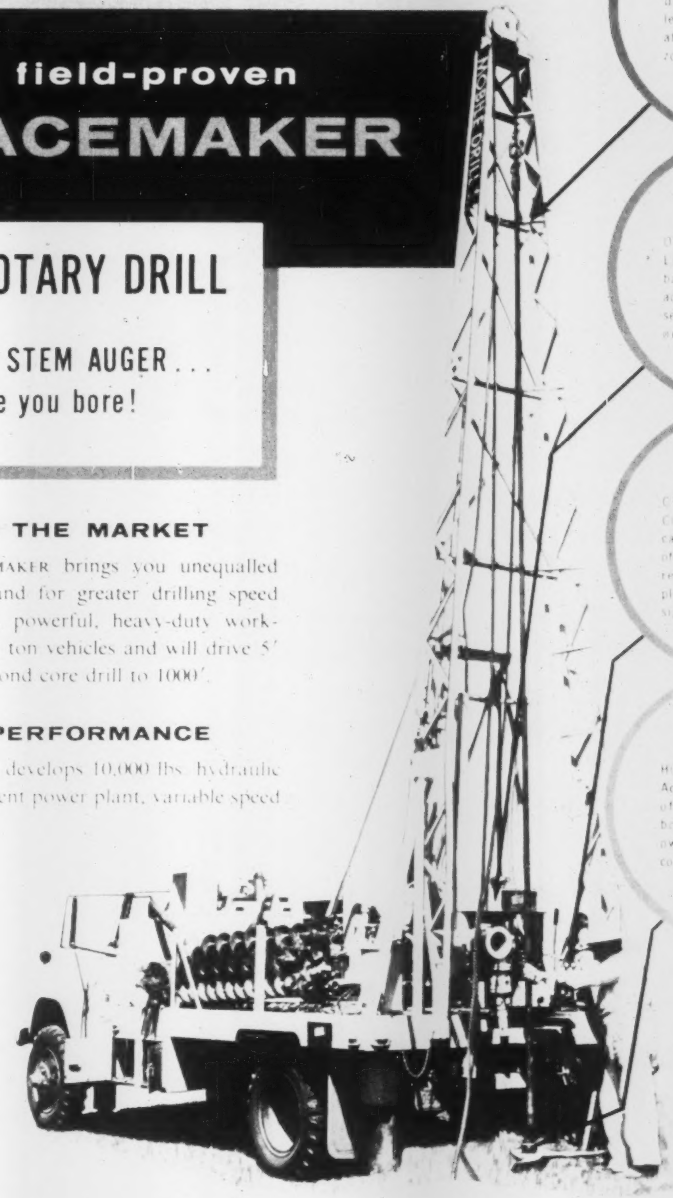
1 Mobile Drill does all **4**

- **SOIL SAMPLING**
- **DIAMOND DRILLING**
- **AUGER BORING**
- **PERCUSSION DRILLING**

the powerful, field-proven
B-52 PACEMAKER

HYDRAULIC ROTARY DRILL

time-saving HOLLOW STEM AUGER . . .
lets you sample while you bore!



TIME-SAVER

22' TOWER—Permits withdrawal of tools in 20' lengths. Mechanically operated, jack-knifes to horizontal position for safe legal highway travel.

TIME-SAVER
No. 2

OFF-THE-HOLE HYDRAULIC BASE—Rail-mounted base slides out of way while adding or withdrawing drill sections, assures continuous perfect alignment. Hydraulically operated.

TIME-SAVER
No. 3

CENTRALIZED 1-MAN CONTROL GROUPING—Located on operator's side of drill base within easy reach. Fingertip controls plus advanced safety design increases operator's efficiency.

TIME-SAVER
No. 4

HOLLOW STEM AUGERS—Actually permit all types of sampling while you bore! Augers form their own casing, also allow coring through hollow stem after rock has been reached.

ONLY 4-IN-1 RIG ON THE MARKET

Mobile Drill's new B-52 Pacemaker brings you unequalled versatility to meet today's demand for greater drilling speed and flexibility. Here's a rugged, powerful, heavy-duty workhorse that mounts on 1½ to 2½ ton vehicles and will drive 5′ sectional augers to 200′ diamond core drill to 1000′.

BIG POWER . . . BIG PERFORMANCE

Pacemaker's twin hydraulic feed develops 10,000 lbs. hydraulic ram force! Rig has own independent power plant, variable speed control on rotary drive.

COMPACT . . .
SELF CONTAINED

Custom mountings are designed to meet your needs. Special body fabrications provide storage racks for augers and watertight compartments for tools and accessories everything to make the Pacemaker a mobile, fast moving, time saving unit.

MOBILE DRILL

WRITE FOR BULLETIN TODAY!

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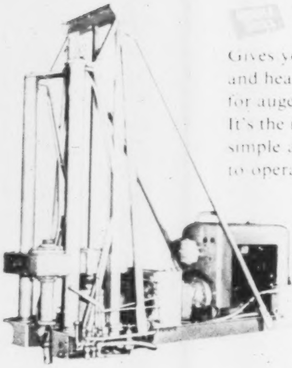
Get **MODERN MOBILITY**
with MOBILE DRILLS
famous the world over for
operating ease, speed, economy

MOBILE DRILL

modern mobility

gives you the speed, power, versatility to handle any drilling job . . . **anywhere!**

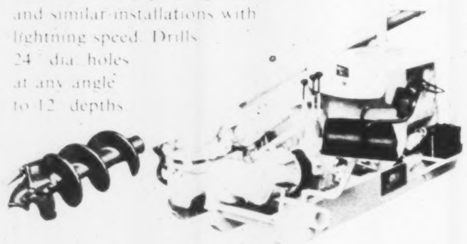


B-52

Gives you Pacemaker power and heavy-duty performance for auger drilling to 200'. It's the ideal starter rig . . . simple and economical to operate and maintain.

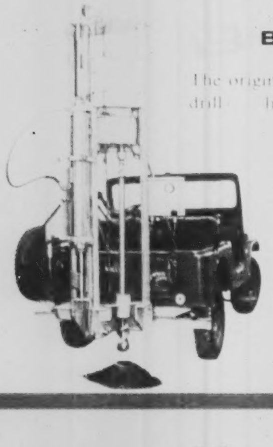
B-40
EXPLORER

International award winning B-40 brings you unequaled versatility in drilling. This light weight unit augers to 100' and core drills to 250' . . . it's a natural for diversified exploratory work.



DIGGER

A production unit built to bore holes for utility poles, guard rails and similar installations with lightning speed. Drills 24" dia. holes at any angle to 12' depths.



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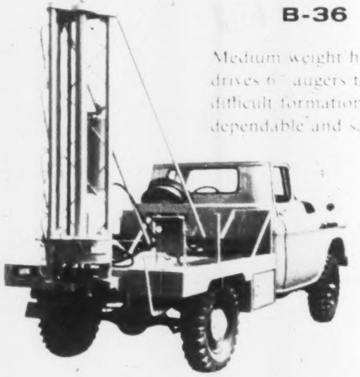

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. . . Reader Comment

You can report the Administration "is wary of trying to force private investment on recipient governments." But this idea should be expanded to include all aid. We should not force foreign governments to accept aid in any form whatsoever. The allocation of aid funds by the department of the government dealing in foreign policy is fundamentally wrong. Requests for aid should come from the host country. This has not been the case, unfortunately, and the foreign government finds itself paying for projects that are in effect monuments to the U. S. The money for many of these could have been put to better use in other projects.

HARRY RAE SHAWK, P.E.
Consulting Chemical Engineer
Nassau, Bahamas

Higher Tunnels

SIR—Re the note in "Japanese Finish Long Bore" (ENR Mar. 19, p. 130) that the tunnel, Sasago, at 3,630 ft above sea level is believed to be the world's highest tunnel: The Albula railroad tunnel in Switzerland, length about six miles, is located about 6,000 ft above sea level. There are probably other tunnels, railroad as well as highway, at elevations higher than 3,630 ft.

P. E. GISIGER
Sao Paulo, Brazil

For the record—The structural steel contract reported in ENR May 21, p. 22, for Grand Central City, 55-story office building to be erected in New York City, may not be the largest dollar-wise after all. No dollar figures are available, but the Chase Manhattan Bank building, now under construction in New York, required somewhat more than 50,000 tons of steel compared with Grand Central City's 40,000 tons. While the Empire State Building in New York incorporates 57,000 tons, steel cost much less when it was built.

For Your Calendar . . .

National Society of Professional Engineers, Annual Meeting, Commodore Hotel, New York City, June 17-20. Write C. L. Ritchie, NSPE, 2029 K St. N. W., Washington, D. C.

American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 21-26. Write ASTM, 1916 Race St., Philadelphia 3, Pa.

American Institute of Architects, Annual Meeting, Roosevelt Hotel, New Orleans, La., June 22-26.

Illuminating Engineering Society, Great Lakes Regional Conference, Hotel Lafayette, Buffalo, N. Y., June 22-23. Write Lee R. Menteer, IES, 535 Washington St., Buffalo 3, N. Y.

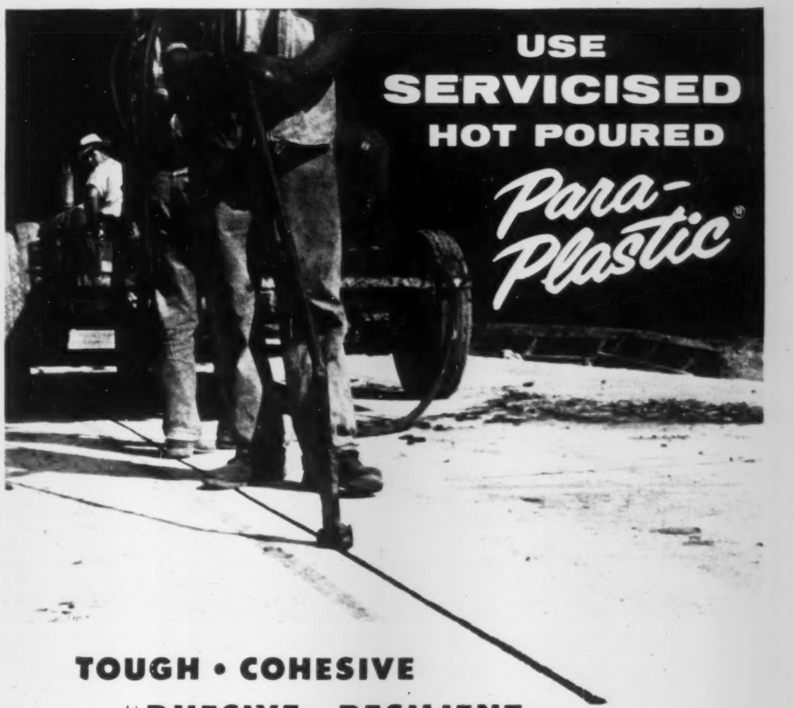
Air Pollution Control Association, Annual Meeting, Hotel Statler, Los Angeles, Calif., June 22-26.

Asphalt Institute Mid-June Meeting, Hotel del Coronado, San Diego, Calif., June 24-25.

American Association of Cost Engineers, Annual Meeting, Carnegie Institute of Technology, Pittsburgh, Pa., June 24-26. Write: Edward D. Shanken, University of New Hampshire, Durham, New Hampshire.

Waste Disposal in Marine Environment, First International Conference, University of California, Berkeley, Calif., July 22-25. Write: Department of Conferences, University Extension, University of California, Berkeley 4.

For EFFECTIVE Highway Joint Sealing



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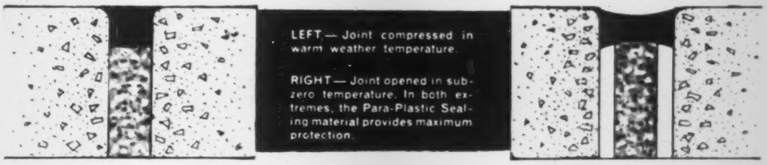
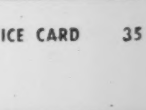


LEFT— Joint compressed in warm weather temperature.

RIGHT— Joint opened in sub-zero temperature. In both extremes, the Para-Plastic Sealing material provides maximum protection.

Drawings above illustrate the sealing of a typical pavement expansion joint. Para-Plastic can be used equally well to seal contraction joints in highway pavement. Sealed with hot poured Para-Plastic, the joint remains free of water and other foreign material which could cause failure of the concrete.

For complete information on Hot Poured Para-Plastic and other products for highway and engineered construction, write for the Servicised Products Catalog.



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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

COST CUTTER—Architects will get 5% of any money saved from the budgeted cost of building projects under a new bonus plan instituted by the Jefferson County, Colo., Board of Education. There are two sides to the story, though. Architects must redesign any buildings whose bids exceed the budget by more than 5%.

LABOR LAW MUDDLE—The Senate Labor Committee has voted, subject to Senate approval, to give its special Taft-Hartley study committee another six months to complete its work. Because labor reform legislation and Taft-Hartley Act amendments have become so intertwined, this adds to the likelihood of no labor legislation of any kind this year.

AIRPORT OUTLOOK—Democrats say they had a "loaded veto pen at our head" when they agreed to a bill for $63 million a year for federal aid to airports this week. Senate-House conferees had to come up with some kind of bill to make funds available for the new fiscal year, starting July 1. The Senate earlier passed a $465-million bill, while the House okayed a $297-million package. Both were too steep for the President. Now Democrats say they'll "demonstrate the need for a bigger airport program."

FOR RENT—Hertz Corp. may start leasing bulldozers and other types of construction equipment. Walter L. Jacobs, president of the car and truck leasing company, says rental of all types of heavy equipment "will become as big as truck leasing is now."

CHEAP EQUIPMENT FOR MOHOLE—General Motors' Electromotive Division offered last week to furnish a million dollars worth of equipment for a dollar a year to the Mohole project, the National Academy of Sciences' undertaking to penetrate through the earth's crust. The first hole would probably be sunk to a depth of 30,000 ft below sea level in a section of the Atlantic or Pacific floor where the crust is relatively thin.

RESURRECTING A PIONEER—At Derbendi Kahn Dam in Iraq, the contractor is re-erecting the world's first full-scale steam-jet vacuum cooling plant for aggregates. It's part of a concrete plant dismantled a year ago because of foundation trouble. The refrigerating equipment can cool 40-45 cu yd of sand an hour. J. A. Jones Construction Co., of Charlotte, N. C., heads the joint venture, with a $46-million contract.

LISTENING POST?—The $1-million U.S. embassy building under construction in Karachi, Pakistan, will be finished too late. Pakistan now plans to move its capital 1,000 miles to the north.

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A
BULLDOZER
TOUCHES
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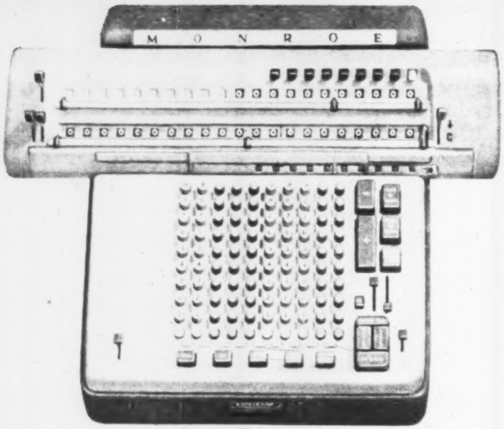

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WASHINGTON OBSERVER

- **Air defense plans: Still cloudy**
- **Columbia River plan moves ahead**
- **US rejects plea for import quotas**

- **Outlook for construction of new bases for the Army Nike-Hercules and Air Force Bomarc antiaircraft missiles is still cloudy,** despite presentation to Congress of the Administration's new and much-publicized "master plan" for air defense.

The new plan is supposed to resolve the inter-service rumpus over the two competing missiles. It involves a cut of about 25% in scheduled expenditures for production and base construction for the two missiles over the next five years—a total reduction of some $1.5 billion. For Bomarc, the cut amounts to about $900 million, for Nike-Hercules about $600 million.

But the plan has stirred up so much Congressional criticism that it's still possible the lawmakers will upset the Administration's latest plans.

The current Bomarc program includes 19 bases authorized through fiscal 1959 (only four are under construction) and five in the fiscal 1960 budget. The fiscal 1961 budget will reportedly call for six more bases. Details on the Nike-Hercules are not known. But a Senate committee has already ordered a virtual freeze in construction of new bases.

- **Columbia River report of the Corps of Engineers has been approved with only minor exceptions** by the Corps' Board of Engineers for Rivers and Harbors.

The recommendation to the Chief of Engineers approves the $1.8-billion program of the North Pacific Division Engineer (ENR Dec. 11, p. 26, Dec. 18, p. 23, 1958) with these modifications:

Raise the pool elevation of the High Mountain Sheep project by 20 ft, keeping location above the mouth of the Salmon River and below the mouth of the Imnaha.

Defer authorization of two projects—Wenaha Dam on the Grande Ronde River and navigation development of the Upper Columbia.

The board goes along with the recommendation for the lower canyon project on the Salmon River, when a satisfactory method of transporting fish around the dam has been developed.

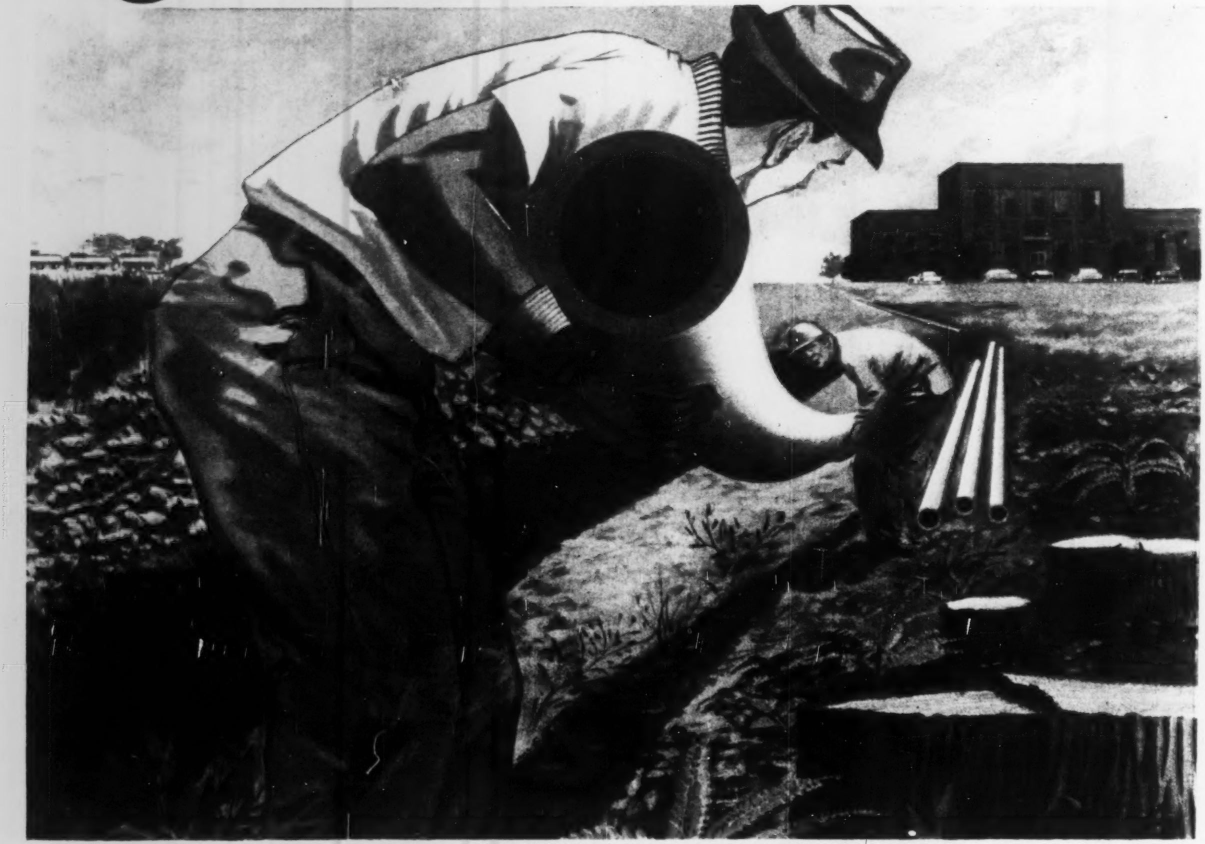
- **The federal government has rejected requests by domestic suppliers of hydraulic turbines and generators for new protection against foreign competition.** The ruling came from the Office of Civil and Defense Mobilization.

U. S. firms had asked for quotas on all imports, for private as well as federal jobs. U. S. suppliers now get a price differential ranging from 6% to 12% on federal jobs. They maintain that lower production costs in England, Switzerland and Italy enable foreign firms to underbid American firms.

The new ruling will heat up the fight in Congress for legislation providing more protection for U. S. industries. This cause has gained adherents rapidly, particularly during the late recession.

Last winter, OCDM approved Corps of Engineers paying 18% more than the low bid from a foreign firm to give a hydraulic turbine contract to Baldwin-Lima-Hamilton. The equipment involved was for the Greer's Ferry, Ark., Dam of the Army Engineers.

USCOLITE PLASTIC PIPE



*Commonwealth of Virginia, Hampton Roads Sanitation District Commission Treatment Plant at Foot of 44th St., Norfolk, Va.

Uscolite pipe solves an external corrosion problem for sanitation district

The Uscolite® pipe line installed in this treatment plant* carries 150 gallons a minute of a saturated chlorine water solution (actually treated sewage water) from the chlorinator to the main sewage line entering the plant.

Prior to installation of Uscolite, pipe severely corroded externally due to the chemical content of the soil and electrolytic action. *Uscolite has eliminated the costly maintenance and constant replacement of pipe.* Uscolite pipe was installed above and below ground because it is rigid enough to resist soil pressure, yet flexible enough to follow earth contours. UscoWeld† Fittings were installed in a fourth the usual time, saving many dollars. The welds are as strong and permanent as the pipe itself. Clamp-type fittings that leak, pull off and impair flow are never needed. *Not one foot of Uscolite Pipe has ever failed in service, when used in accordance with our recommendations.*

USCOLITE ELIMINATES COSTLY PIPE INSTALLATION

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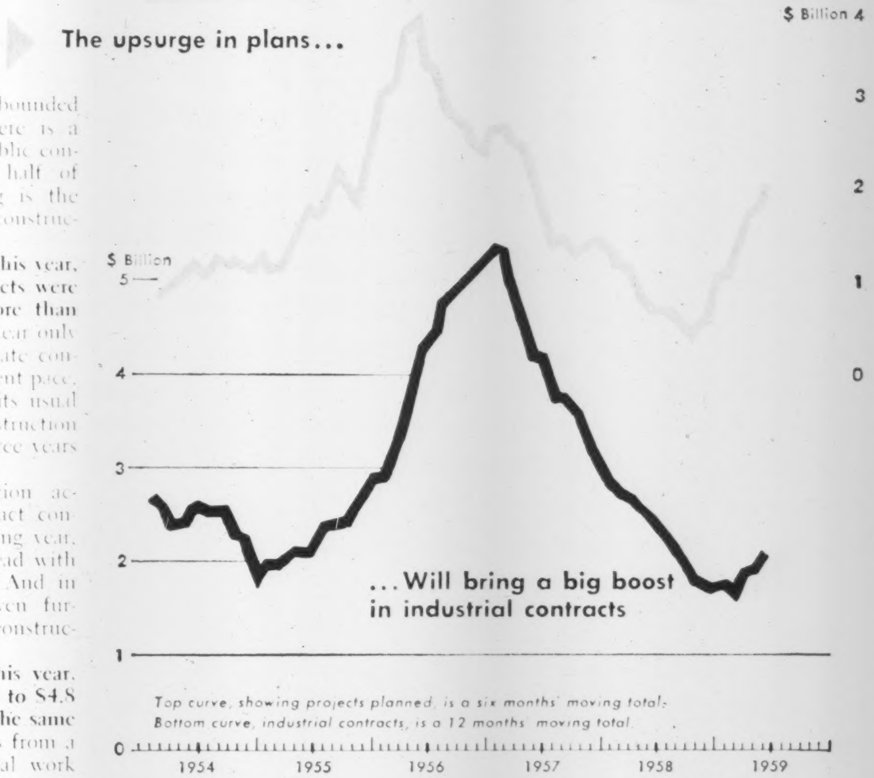
JUNE 18, 1959

ENGINEERING
NEWS-RECORD

Private Work Is Booming

Most of the push is from industrial construction



Top curve, showing projects planned, is a six months' moving total; Bottom curve, industrial contracts, is a 12 months moving total.

Private construction has rebounded so strongly this year that there is a good chance it will overtake public construction during the second half of 1959. And industrial building is the whip that's driving private construction toward the lead.

For the first five months of this year, 49% of all construction contracts were let for private work—much more than forecast earlier this year. Last year only 40% was private work. If private contract awards maintain their present pace, and public works experiences its usual fall slowdown, private construction could regain the lead it lost three years ago.

In 1956, private construction accounted for 62% of all contract construction work. But the following year, public construction took the lead with 53% of construction volume. And in 1958, public works moved even further ahead, with 60% of the construction market.

For the first 24 weeks of this year, public contract awards dropped to $4.8 billion, 1% below its total for the same period in 1958. The dip results from a decrease in state and municipal work to 5% under last year, caused by fewer dam awards.

By contrast, private awards have shot up 16% over last year, to $4.6 billion. Behind the surge is a 32% upswing in industrial contracts this year over last.

The recent upturn in industrial building contracts seems to be the jumping-off spot for a major expansion of this key market. New plants are entering the planning stage in heavy volume (ENR Apr. 9, p. 102). As design work is completed on these projects, industrial building contracts can be expected to climb sharply (see chart).

New plants proposed in May had a total estimated cost of $372 million, more than five times the low volume of May, 1958. Moreover, for the first five months of 1959, ENR figures show new plant proposals hitting a whopping $1.5 billion—nearly three times the amount proposed in the first five months of last year.

The 1959 figure is only about half as great as the record pace of 1956, but this year's volume of proposed plants equals the 1955 rate, which set the stage for the '56 boom.

Contracts are beginning to mirror the upswing in plans although they have a long climb before fully reflecting the recent rise in proposed plants (chart).

Industrial contract awards are already well beyond the optimistic forecasts made earlier this year (ENR Jan. 15, p. 21). The estimate for 1959 awards was pegged at $1.8 million in January. But in the first five months alone, awards have neared $1.3 million.

The 32% rise in industrial contracts for the first 24 weeks of this year is almost eight times the 1959 increase predicted in January.

A look at the weekly averages of contract awards is equally encouraging. The total of $1.2 billion in awards for the first five months of 1959 represents a weekly average of $52 million—almost a 75% increase over the low $30-million weekly average in the last six months of 1958.

The recent pace of industrial awards is up even more. The weekly average of contract awards in March was $81 million; in May it was $70 million. These are 75%-100% above the "$40 million per week by May" that was forecast in January.

Increased capital spending plans by business is another sign of a potential boom in industrial construction activity. The latest government survey of capital spending plans shows that businessmen intend to spend 7% more on new plant and equipment this year than in 1958 (ENR June 11, p. 92). In the March survey, businessmen had only intended a 4% increase this year. Economists figure that about 30% of capital expenditures expected to hit $32.6 billion this year generally goes for new plant construction.

Still one more bright sign is the record level of the ENR backlog of proposed industrial buildings. The backlog figure reached an all-time high of $17.1 billion as of December 31, 1958. At the end of May, the backlog re-

Industrial Building Contracts by Industry—First 5 Months

INDUSTRY	Dollar Value 1959 (millions)	Dollar Value 1958 (millions)	% Chg.	Number of Plants 1959	Number of Plants 1958	% Chg.
All Industry	$1,148.8	$825.0	+ 39	876	639	+ 37
Above 1958 Dollar Volume						
Chemical process*	427.7	320.6	+ 33	172	138	+ 25
Public utilities	270.8	191.1	+ 42	38	35	+ 9
Metal refining and rolling	137.6	107.9	+ 28	29	9	+222
Food	78.9	33.5	+135	153	95	+ 61
Machinery and parts	77.5	55.3	+ 40	115	92	+ 25
Aircraft	23.4	10.1	+132	40	15	+167
Automotive service	21.2	7.5	+182	47	27	+ 74
Automobile	14.1	9.6	+ 48	8	5	+ 60
Radio, TV, electronics	14.0	4.0	+250	20	6	+233
Wood	6.0	3.1	+ 92	15	7	+114
Textiles	5.5	2.6	+108	15	9	+ 67
Foundries	1.7	0.3	+454	3	2	+ 50
Railroad	1.3	1.0	+ 34	4	4	0
Refrigeration and cold storage	0.7	0.5	+ 40	4	3	+ 33
Below 1958 Dollar Volume						
General	68.4	78.0	− 12	213	192	+ 11

* Includes aluminum production facilities

mained at the same record high, despite the sharp increase in contract awards during recent months.

This means the flow of new industrial building proposals into the backlog is increasing as fast as the flow of proposed construction into the contract stage.

Metal refining and rolling firms sparked the May surge in industrial contracts. At the end of April, this was the only major industry trailing its 1958 volume. But $103 million in May awards lifts the five-month total to $138 million, which is 28% ahead of last year's rate.

The May rise in metal-refining and rolling contracts reflects a sharp rise in spending plans of the iron and steel industry for the third quarter of 1959.

Thus far in 1959, the chemical process, public utilities, metal-refining-and-rolling, food and machinery-and-parts industries lead the parade in industrial contract awards.

Private mass housing and commercial building contracts have also helped bring the rebound in private construction.

Mass housing contracts hit $2.1 billion in the first 24 weeks of the year, 17% higher than this time last year. The total makes housing the first category, public or private, to top the $2-billion mark this year. Commercial building, which started slow, has climbed to a healthy $1-billion total—7% higher than a year ago.

In public works, federal construction is up 11%. Missile construction is more than offsetting the decline in Capehart housing. The 5% drop in state and municipal work stems solely from fewer contracts for dams.

Missile-Mail Depots? Don't Bet on It

"A major new technique of communication of historic significance to the peoples of the entire world." That's how Postmaster General Arthur Summerfield described the transportation of 3,000 letters 100 miles by a Regulus I guided missile last week. And newspapers across the country gave the story big play.

But generally unreported were these facts:

The Regulus I is a 600-mph missile—essentially a pilotless airplane guided by remote control apparatus that is no longer in production. It's no faster than a conventional jet transport plane.

The government isn't doing any serious work on the design of cargo-carrying missiles, although a rocket-powered guided missile could, in theory, be designed to carry mail or other cargo through space at the speed of sound.

Some imaginative officials foresee construction of complex special facilities in the future to handle large volumes of mail carried by pilotless, remote-controlled vehicles—faster and bigger than the one used in last week's test.

Many other Washington observers dismiss the mail test flight as a stunt. The experiment showed that missile mail shipment is technically feasible, but the economics of mail delivery by unmanned aerial vehicles is yet to be proven.

Don't expect to see big contracts for "missile mail depots" coming, even if it does make interesting summer reading.

Two Cities Sign Contracts For Zimmermann Plants

Chicago last week showed strong confidence in the results of last year's pilot study of the Zimmermann process, a new wet-oxidation method of disposing of sewage sludge. Wheeling, W. Va., plans to do likewise this week.

Chicago's Metropolitan Sanitary District signed an $11.9-million contract for a 200-ton-a-day Zimmermann plant. Wheeling reportedly will contract this week for a $284,000, 5.6-ton-a-day plant. They will be the first full-scale Zimmermann plants in the country.

The Zimmermann process burns up most of the solids in sludge by flameless combustion under considerable pressure and heat (ENR Nov. 27, 1958, p. 44). Chicago's one-year trial of a two-ton-a-day plant was hailed last fall as a success, and the Sanitary District announced plans a few months ago to build a new plant (ENR Mar. 19, p. 50).

The Chicago installation will consist of four 50-ton-a-day oxidation units plus a turbogenerator. The 200-ton capacity will represent more than 20% of the district's total treatment capacity.

Chicago expects to contract within 60 days for a $400,000 to $500,000 building for the plant.

The first 50-ton unit is expected to be in operation by October, 1960. The entire plant is scheduled for completion in 24 months.

Chicago will pay no additional royalties for use of the proprietary process. Wheeling, however, will pay royalities of $3 per ton of solids handled. Indications are that royalties for future plants may be higher, especially if the Chicago operation proves as economical as expected.

Construction contracts were signed with Sterling Drug, Inc., of New York City, which also owns the patents.

The first full-scale Zimmermann process plant anywhere is nearing completion in Norway.

More ICBM Test Facilities To Be Built by Air Force

Bids will be accepted in late June and mid-July for $14.9 million worth of construction work on testing facilities for intercontinental ballistic missiles at Patrick Air Force Base, Cocoa, Fla.

The Jacksonville District Corps of Engineers will receive bids about June 30 for two underground launching silos and about July 15 for construction of two complete launch complexes.

Each complex will consist of a firing pad with underground equipment room, optical alignment buildings, launch support buildings, a blockhouse, an assembly facility for missiles, an engine shop, storage and other support structures.

Canadian Engineers Move Toward Unity

Confederation of engineering societies of Canada took the spotlight last week at the seventy-second annual meeting of the Engineering Institute of Canada in Toronto—even though the subject was not listed on the crowded official program.

Floor discussion clearly showed the membership's impatience for action on confederation along the lines already laid out by an EIC committee study. The committee, which worked jointly with a similar group established by the Canadian Council of Professional Engineers, recommends establishing a Joint Committee of Confederation to draft a constitution for a new national organization.

But the proposal must first be approved by a majority of EIC's members. It has been circulated for balloting. Should it be approved by July 4, when the balloting period ends, it will take another year or more to prepare the constitution and bylaws.

EIC is the national voluntary engineering society that serves the technical needs of all main branches of engineering.

Many EIC members also belong to CCPE, which brings together representatives of 14 provincial associations of engineers. These are legally established bodies that control the practice of engineering and registration in Canada's 10 provinces and in the Yukon Territory.

Originally established with EIC's aid, the associations now have a total membership much larger than EIC.

According to present confederation plans, licensing would remain the legal prerogative of the provincial associations, which would continue their registration work.

Coordination of provincial activities on the national level, and all technical activities, would be handled by the national confederation, which would work closely with the provincial associations.

Key to the confederation movement is common membership. Admission to the national body could come only through membership in a provincial association.

• **Seaway work described**—In keeping with the general character of EIC, the technical program of the three-day meeting covered all main branches of engineering.

In civil engineering, the greatest interest was concentrated on the St. Lawrence Seaway and Power Project, to which eight papers and a panel discussion were devoted. They covered such topics as the use of 70,000 cu yd of fly-ash in the concrete of the Canadian section of the Barnhart Island powerhouse; the criteria that had to be met in the hydraulic design; the economics of the Seaway part of the project; and the large rehabilitation program that the Hydro-Electric Power Commission had to carry out because of extensive flooding on the Canadian side of the St. Lawrence, above the powerhouse.

J. H. Jackson, of the commission, noted that seven towns disappeared, to be replaced by two entirely new towns, to which over 500 houses were moved from their old locations. Also relocated were 35 miles of the main double-track line of Canadian National Railways and many miles of highways.

By-product of this rehabilitation program was described in a paper by A. T. Edwards of Ontario Hydro and T. D. Northwood of the National Research Council. Houses that could not be moved from their locations were used for experiments on the effects of blasting. It was found that velocity measurements proved to be a reliable guide to the incidence of blast damage.

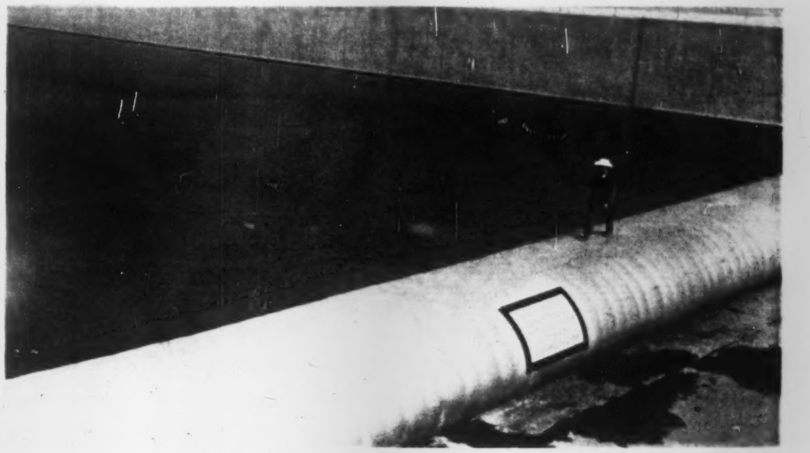
• **Toronto sewage plant**—R. L. Clark, Commissioner of Works for Metropolitan Toronto, described the new Humber sewage treatment plant.

The establishment of a metropolitan government for Toronto has enabled planning to be carried out for such municipal services as sewage treatment without regard to the older and quite irregular municipal boundaries. The benefit of this is seen in the planning for the new Humber plant.

It is located near the shore of Lake Ontario adjacent to the Humber River. Possibly the most unusual feature of the plant is the effect that the surrounding residential district had on planning.

The location had to be shifted to shield the plant from existing residences.

J. J. Hanna of Calgary was installed as the new president of the institute.



Rubber Dam Collapses in Floods

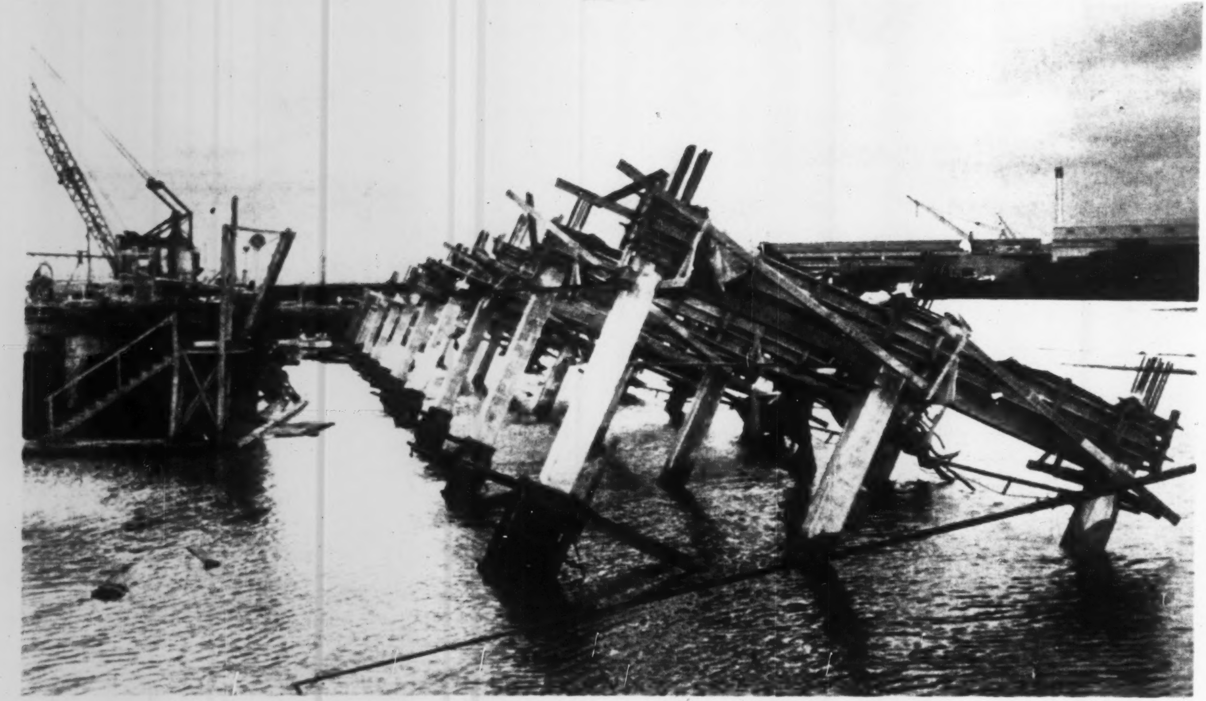
A huge, inflatable rubber tube designed to act as a part-time dam has been constructed across the channel of the Los Angeles River, in Los Angeles. Purpose of the dam is to divert river water onto adjacent spreading grounds, where it percolates into the groundwater for later recovery by pumping.

The flexible dam is designed to collapse when flood waters top it by eight inches. This apparent reversal of a dam's function is required by the Corps of Engineers, who fear local flooding would result during winter rainfalls if a barrier remained in the channel.

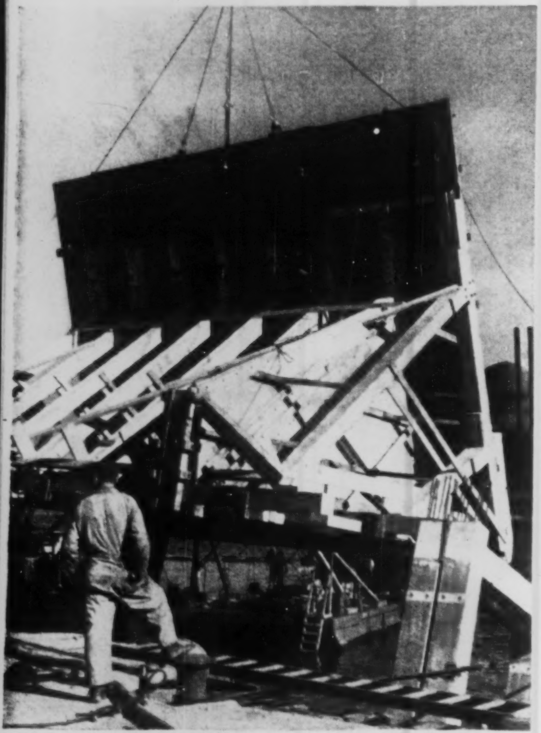
The dam is composed of a neoprene coated, nylon fabric tube extending across the 130-ft.-wide channel. The tube is bolted to the floors and sides of the concrete-lined channel. It is inflated with water and stands 5 ft 1 in. high. It can be deflated in 12 minutes by siphon. Normally it is reinflated within 24 hours after the flood passes. But in emergency it can be filled in 25 minutes.

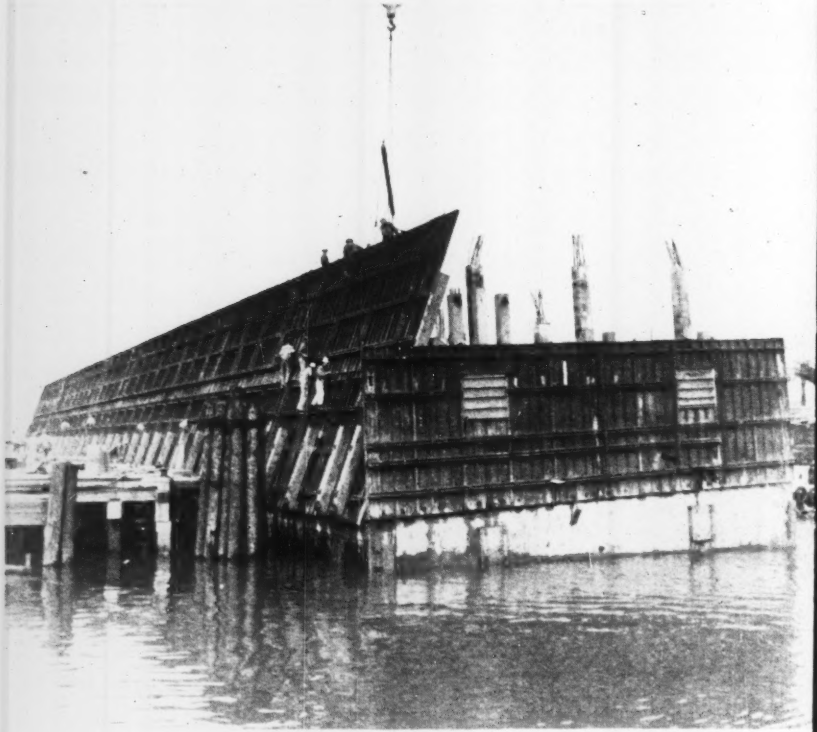
The Los Angeles Department of Water and Power had previously used a wooden dam to divert the water. In some seasons two or three dams would be erected, each at a cost of $1,000. The rubber dam cost about $10,000 and is expected to last six to 10 years. Some 3,000 acre-ft of water, valued at $75,000, are expected to be saved annually.

Sunken Pontoon Is Salvaged With



SUNK with only its roadway columns showing above water, this pontoon was . . .





RAISED by putting down sections of casting forms to make a cofferdam.

Help of Its Original Forms

Steel forms used to make the concrete pontoons that sank in Washington's Duwamish Waterway last December were also used to raise one of them.

The pontoons—two of 23 being cast for a $14-million floating bridge across Hood Canal—are 50x360 ft and 14 ft high. They sank one night while tied up side by side at a dock (ENR Jan. 8, p. 25).

The outer pontoon, with a 34-ft-wide roadway already in place on 32-ft-high columns, sank completely. The inshore pontoon submerged at a 22-deg angle away from the dock. Its half-finished columns were all that showed above water.

The salvage job ran to $750,000—three-quarters of the original building cost for the two pontoons. But the job had to be done; in their sunken position, the units were blocking the way of other pontoons.

The outer pontoon will be repaired and used. But the inner one was rejected; its back was broken.

First step in the operation was to remove the roadway slab. It was fished up in three 350-ton sections by barge-mounted winches. Two sections were towed away and sunk in deep water; the third section was grounded nearby for inspection.

Then work started on the tilted inshore pontoon. It was refloated by building a cofferdam down to the deck and then dewatering cofferdam and pontoon. Here's how this was done:

As quickly as steel forms were stripped from new pontoons being cast, they were bolted to 40-ft-wide framework sections made of 12x12-in. timbers.

Each section consisted of sixteen 5x15¾-ft steel panels. The panels were bolted together to a height of 31½ ft. Rubber seals made the sections watertight.

Since the pontoon was tilted, the framework was built at an angle to allow the cofferdam to extend upward vertically in the water. This reduced uplift on the wall and limited the area to be dewatered.

The 31½-ft-high wall was needed on only the low side of the pontoon, where the water was 32 ft above the deck at high tide.

One row of the 15¾-ft-high panels was enough at the ends of the pontoons. A 30-in.-high timber wall did the job on the high side of the pontoon.

The 22-ton sections of cofferdam were placed by crane. Steel scrap was loaded on the framework to weight it down to the pontoon deck. Cables from cofferdam to pontoon kept the cofferdam from rotating upward.

Only the timber framework rested on the pontoon. The panels extended about 1 ft below the pontoon edge and were held tightly to the pontoon by the tie rods.

When in place, the sections were bolted together and grout was pumped between the pontoon deck and cofferdam base to make a watertight joint.

Placing of the cofferdam, at the rate of one section daily, was directed by six divers working around the clock over a two-week period.

Air remaining in the 27 low-side cells of the pontoon was bled off before dewatering started.

Pumps with a combined capacity of 40,000 gpm pumped out the 800,000 gal of water necessary to float the pontoon.

Care was taken to restrain the low side of the pontoon during pumping. This kept the pontoon from righting itself rapidly and swamping the 30-in. inboard wall of the cofferdam.

After the pontoon had been pumped dry and floated, it was towed out into the channel. There it was turned about and brought back so that the high wall of the cofferdam was next to the dock for easy dismantling.

Raising the completely submerged outer pontoon was a less spectacular operation.

Twenty-four 100-ton-capacity winches were mounted on both sides of two 150-ft-long barges.

The barges, placed end to end, were positioned over the pontoon. Cables were jetted under the pontoon to run from a winch on one side of the barge to one on the other side.

Total submerged weight of the pontoon was 2,300 tons. This was reduced to 800 tons by pumping air into each of the 96 cells that might hold air; all but 15 did.

The air was carefully controlled to insure against a positive buoyancy and almost certain damage to the pontoon if it should surface.

The winches gently lifted the pontoon at the rate of 4 in. an hour for a total lift of about 10 ft.

Tugs were attached to the barges and the still-submerged pontoon was towed to a floating drydock. The pontoon was deposited on the floor of the drydock; drydock and pontoon were then dewatered.

Washington Toll Bridge Authority is owner of the bridge. Morrison-Knudsen Co., Henry J. Kaiser Co., Puget Sound Bridge & Dredging Co. and General Construction Co. are building the pontoons. M-K has charge of the project for the combine, with Tom Moyer as project manager, Glenn Fox as project engineer and Darwin Lind as general superintendent.

Fred Devine, of Portland, Ore., was retained as salvage supervisor.

Why the Pontoons Sank

Two possible causes for the sinking of the bridge pontoons in Washington's Duwamish Waterway (see above) are offered by consulting engineers engaged by the state to investigate the accident.

A row of bolt holes runs around each pontoon. They are for joining the pontoons and for fastening on a fendering system. The holes are about 18 in. above waterline on the inshore pontoon. The heavy superstructure of the outshore pontoon brought the holes within 2-to-7 in. of the water.

Consultants John I. Parcel, Ralph A. Tudor and Willis T. Batcheller give these possible explanations:

- **Wave action sloshed water into the outer pontoon through the bolt holes or . . .**
- **A passing gravel barge snagged an anchor line, tipping the end of the outer pontoon and allowing water to enter.**

As the outer pontoon sank, its superstructure tipped over on the inshore pontoon, submerging it.

The state maintains the contractor was negligent in not plugging the holes. "We are buying a complete bridge—the accident is not chargeable to us," declared Gov. Albert D. Rosellini, who is also chairman of the Bridge Authority.

The contractor has not commented on the report, but observers don't expect him to accept the financial loss. Indications are, however, that he will have to sue to recover it.

More troubles are in the offing for the contractor. Project completion is set for next May, but delay is likely. The contractor may be held liable for delay penalties of $2,800 a day.

Bid, Bid, Who's Got the Bid?

There was a slight case of confusion when the General Services Administration opened bids in Washington, D. C., last week for the construction of a federal building and post office at Portsmouth, Va.

First the J. L. Coe Construction Co., Charlotte, N. C., was declared the apparent low bidder.

Next morning, it appeared that the Wise Construction Co., Richmond, Va., was the low bidder. This didn't last long, either.

Later the same morning, Virginia Engineering Co., Newport News, Va., was declared the apparent low bidder.

Here's the play-by-play:

When GSA opened bids, Coe's figure of $2,623,737 was low. Then a modification of Virginia Engineering's bid was received by telegram before the 2 pm deadline. But there was a hitch: GSA had never received the original bid; all it had was the modification reducing Virginia's bid by $673,000.

Minutes before the bids were opened, GSA got a $20,000 modification of the Wise bid. GSA considered, then rejected, Wise's modification because it was written in pencil on plain paper instead of being telegraphed or written on a company letterhead.

Virginia Engineering's bid finally arrived the next day. Post office time stamps showed the bid had been filed before the deadline.

Result: Original Virginia Engineering bid, $3.2 million; modification, $673,000; final apparent net low bid, $2,527,000.

(See p.292 for more on GSA.)

Commercial H-Blasts Coming?

If the Atomic Energy Commission succeeds in blasting a harbor with H-bombs in northern Alaska, "We can start making harbors at other sites—for a fee."

So says Gerald Johnson, of the University of California Radiation Laboratory at Livermore. Mr. Johnson made his prediction in a progress report on Project Plowshare, the Atomic Energy Commission's program for peaceful use of atomic explosives, at a meeting in Washington last week.

He also gave more details on the forthcoming test (ENR June 11, p. 32).

Mr. Johnson said three 20-kiloton devices—which cost approximately $750,000 each—will be set off at a 400-ft depth to cut a channel 750 to 900 ft wide, 1,500 ft long and 270 ft deep. Two 200-kiloton devices—which cost roughly $1 million each—will be exploded 750 ft deep to carve out a turning basin some 3,000 ft in diameter.

The total cost of the test is estimated at $7 million.

Mr. Johnson, director of the project, expressed optimism that large-scale excavations ultimately can be made for 20 cents per cubic yard, or even less. Although the economics of the experiment planned are not that good, he said costs should be well below that for conventional excavation in that part of the world.

Mr. Johnson noted that three other tests also are planned tentatively for Project Plowshare: a blast in the Canadian tar sands early in 1960, and tests in New Mexico salt formations and the oil shale formations of Colorado next spring.

Manhattan Getting Three Motels

Three motels will rise within six blocks of each other in midtown Manhattan near the Hudson River. One, the Skyline Motel, is already under construction.

Skyline Motel, estimated at $1.5 million, is located on 10th Ave., between 49th and 50th Sts. It is the first motel to be built in Manhattan. Architect for the five-story building is Leo Stillman, New York City. Contractor is Diesel Construction Co., New York City.

Construction of the $3.5-million Aristocrat Motor Hotel is scheduled to begin in October. It will be located on 12th Ave. between 42nd and 43rd Sts. Plans are by S. J. Kessler, New York City. Edwards Management Co., New York City, is the owner.

No contract has been awarded yet for the third motel, Motor City. The bids received were too far above the original estimate of $4 million.

The motel will straddle New York Central Railroad tracks and cover 2½ acres from 40th to 44th Sts. between 10th and 11th Aves. Owner is Motel City, Inc., New York City. Architects are Weschler & Schimenti, New York.

North Carolina Combines All Its Water Agencies

The North Carolina legislature has passed a measure replacing several overlapping water-resources agencies with a single, new agency—the Department of Water Resources.

The new department will carry out functions handled up to now by half a dozen agencies, including the State Board of Water Commissioners, State Board of Health, State Conservation & Development Department's Division of Water Resources, Inlets and Coastal Waterways, and the groundwater-research activities of the C&D's Mineral Resources Division.

The State Stream Sanitation Committee will also be transferred to the new department but will retain "exclusive jurisdiction" until July 1, 1965, over stream classification. The committee has been working for several years setting up for the various streams standards of pollution control to be followed by municipalities, industries and other stream users.

A seven-member board appointed by the governor will run the new department. A full-time director will exercise administrative control.

Creation of the department implements a major recommendation of North Carolina's Commission on Reorganization of State Government. Backers of the bill included Gov. Luther Hodges, sponsor of the measure, and all the agencies affected.

Webb & Knapp Starts On $500-Million L. A. Project

Ground was broken last week for the first building in Los Angeles' half-billion dollar Century City—an 88-building, 260-acre undertaking.

The first structure to go up will be the five-story, $2.5-million headquarters of Welton Becket and Associates, architects-engineers.

Other phases of the project will start within six months. Century City will include a shopping area of approximately 500,000 sq ft.

William Zeckendorf, president of Webb & Knapp, plans to conclude negotiations for about 80% of the shopping-area space within 60 days. He had purchased the 181-acre West Los Angeles property from 20th Century-Fox Film Corp. for about $60 million.

The project also involves apartment buildings for 11,000 residential units, office buildings up to 30 stories high with over 3 million sq ft of floor space, a 600-room hotel and parking for 40,000 cars.

Welton Becket & Associates are coordinating architects for the development. Other architects and engineers will participate in individual projects.

Cincinnati Sewage Plant Completed

The fight against pollution in the Ohio River was advanced a big step this week with the official completion of Cincinnati's Mill Creek sewage treatment plant. The $26-million plant is the second and largest of three plants to be built under a $60-million pollution abatement program covering metropolitan Cincinnati. Mill Creek is a modified primary treatment plant with a capacity of 120 million gallons a day.

It serves a drainage area of 133 sq mi—about 60% of the total area to be handled by the three plants. The Little Miami plant, already built, has a capacity of 28 mgd and Muddy Creek plant, under construction and to be completed in 1961, will handle 7 mgd.

Design loading at Mill Creek is based upon a suspended solids content of 500 ppm and a biochemical oxygen demand (BOD) of 400 ppm.

Removals will include all settleable solids, 65% of suspended solids, and 45% of BOD.

Construction of the plant started in 1953. It will be placed in operation in October. About $17 million was spent on new interceptors and a large pumping station for the Mill Creek system.

Havens and Emerson, Cleveland was the consulting engineer.

Hangar's Trusses Cantilever 177 Feet

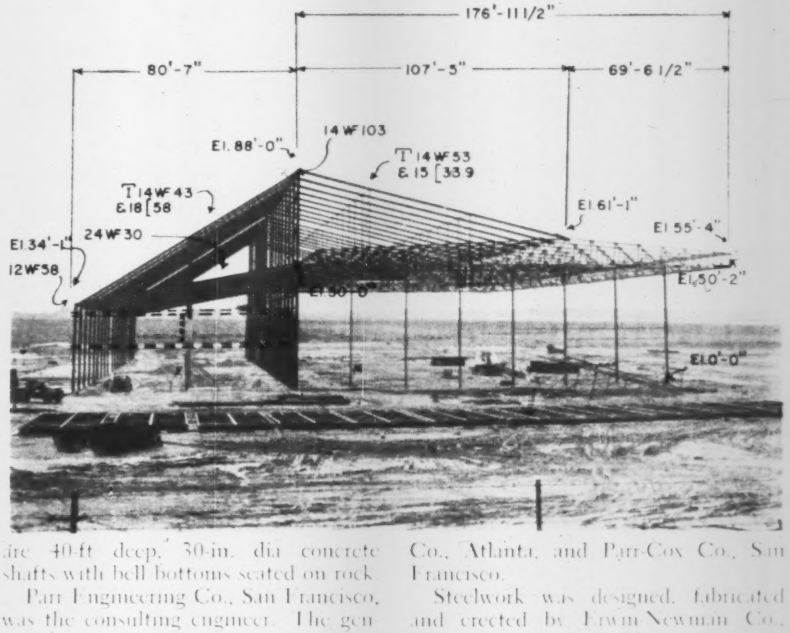
Cantilever truss construction permits 71,400 sq ft of unobstructed floor area in a maintenance hangar being built for Delta Air Lines at Atlanta.

The steel trusses, spaced about 20 ft c-c, project out 177 ft over the maintenance area from a shop structure that extends along one side of the hangar. Doors along the opposite side of the hangar can be moved to open up the full 420-ft length of the building.

The hangar roof deck is carried on the top chord of 177-ft trusses composed of members made of pairs of steel angles. These trusses are supported on columns at the front of the shop structure and by ties about 107 ft out. A single tie, composed of a 14 WF 53 beam with a 15-in. channel on the top flange, connects the top chord of each truss with the top of its column, 32 ft above the roof. The trusses vary in depth from 5 ft at each end to 11 ft where supported by ties.

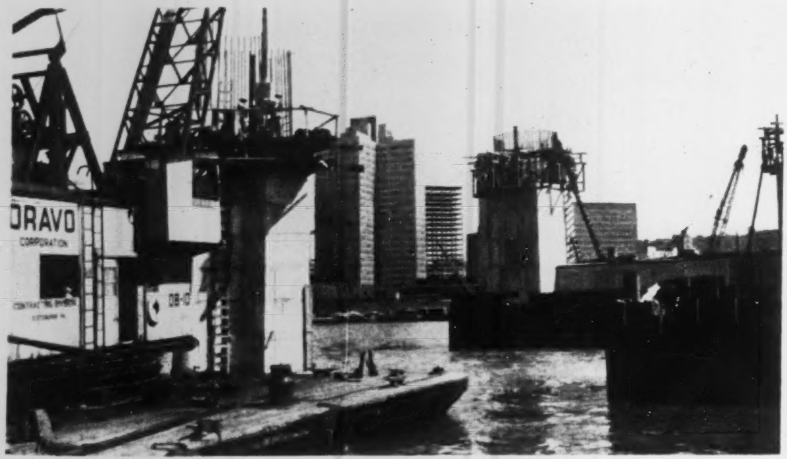
The cantilever framing is restrained by an anchor truss composed of rolled beams. It spans the 81-ft-wide, two-story shop structure and is held down by a steel-beam tie at the rear of the shop structure.

This tie also serves as a column, supporting the shop second floor and roof. Foundations for the anchorage are 40-ft deep, 30-in. dia concrete shafts with bell bottoms seated on rock.



Parr Engineering Co., San Francisco, was the consulting engineer. The general contract for construction is a joint venture of McDonough Construction Co., Atlanta, and Parr-Cox Co., San Francisco.

Steelwork was designed, fabricated and erected by Erwin-Newman Co., Houston, with Paul Norwood as job superintendent.



Fort Duquesne Bridge Piers Rise

The substructure of Pittsburgh's Fort Duquesne Bridge over the Allegheny River is scheduled for completion in early autumn.

Dravo Corp., Pittsburgh, has almost completed the north main pier. Construction of the south main pier is under way. Dravo is building five stone-faced piers, five bents and two concrete retaining walls for $1.9 million.

The bridge is a double-deck, four-lane highway span. It will cross the Allegheny near the Point of Pittsburgh's Golden Triangle. It will be erected almost opposite the Fort Pitt Bridge over the Monongahela River (ENR June 4, p. 28).

The Allegheny and the Monongahela rivers meet at the Point to become the Ohio River.

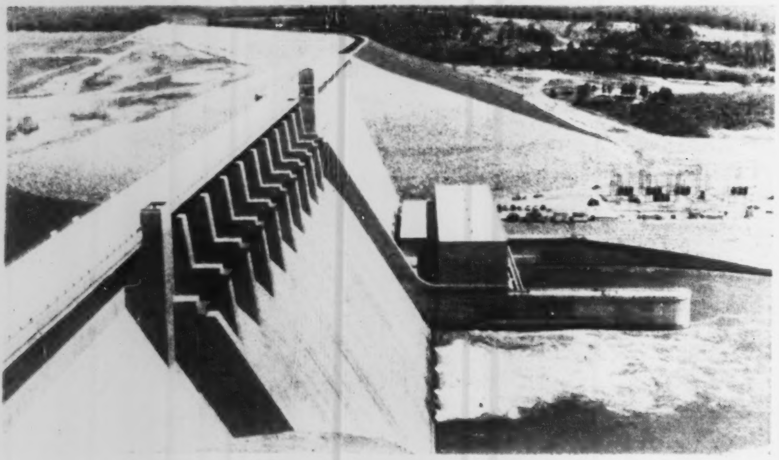


Table Rock Powerhouse Finished

Army Engineers have accepted the 200,000-kw powerhouse at Table Rock Dam, on the White River near Branson, Mo. The dam itself was finished last August.

Table Rock was the first major dam of the Corps of Engineers to be concreted in 7½-ft lifts. Federal agencies and dam designers had made 5-ft lifts a near standard in the U. S.

The new powerhouse cost $6 million. The dam is a concrete and earth structure 6,400 ft long and 261 ft high. It cost $24 million. Counting land, road and utility relocations, and equipment, cost will total $66 million.

The dam was built by a joint venture of six firms: Morrison-Knudsen, Boise, Idaho; Utah Construction Co., San Francisco; H. B. Zachry Co., San Antonio; Ralph E. Mills Co., Salem, Va.; General Construction Co., Seattle; and Fruin-Colnon Contracting Co., St. Louis. The powerhouse was built by a joint venture of Morrison-Knudsen and Utah.

Short Bars Blamed For Brick-Wall Collapse

Failure of an ornamental brick wall around J. L. McReynolds Junior High School in Houston may have been due to inadequate doweling to the foundation. A section 14 ft long and 8 ft high adjoining a gate toppled over. A schoolgirl was killed in the accident.

Francis J. Niven, one of three Houston structural engineers investigating the collapse, reported that reinforcing bars had not been properly installed. The bars were a couple of feet shorter than the 7 ft 9 in. called for by the wall design. There was also reason to believe that the rods were not spaced and anchored to the footing as required by the design, he said.

These conclusions were disputed by Otis H. Brigman, president, Farnsworth & Chambers Co., Inc., the school contractor.

Around the Country . . .

- **Footbridge fails**—The deck of a narrow suspension footbridge tilted, dumping 15 persons into a river 30 ft below, in Big Stone Gap, Va., this week. A broken main cable was the cause. Ten of the pedestrians were injured, three seriously.

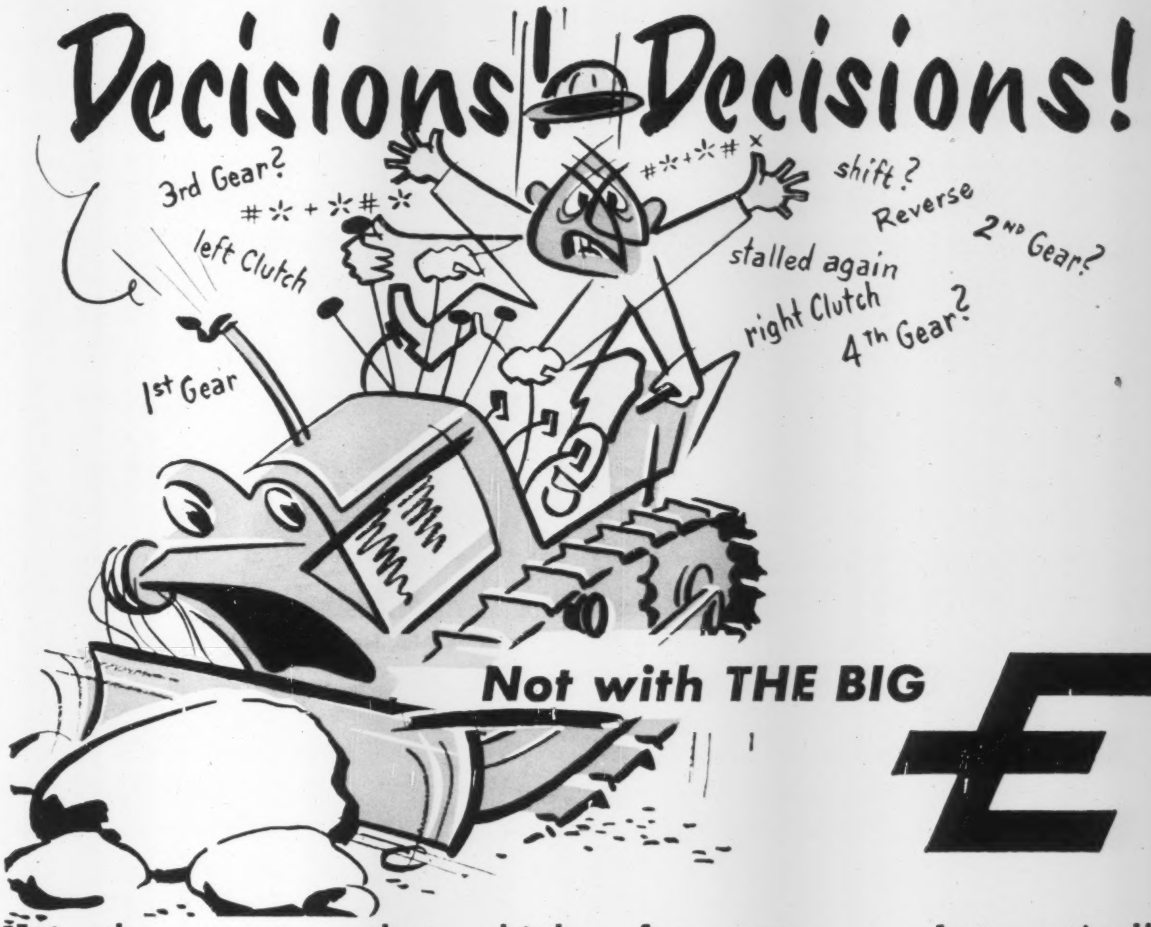
- **New water group**—State water officials have formed a new organization to help coordinate water programs throughout the country. Its secretarial and research work will be handled by the Council of State Governments, Chicago.

- **Interstate reimbursement**—A bill to reimburse states for toll and free roads incorporated in the Interstate Highway System is given little chance to become law, although it has been approved by a House Public Works Committee. The bill would feed $4.3 billion to eligible states over 15 years.

- **Cougar Dam award**—Merritt-Chapman & Scott Corp., New York City, has been awarded the construction contract for Cougar Dam on the South Fork McKenzie River, on a low bid of $23,984,564. Work calls for construction of the dam and outlet works, power intake works and roads. Completion date is March 1, 1963.

- **More time to "Buy American"**—State highway departments have until next January 1 to comply with the "Buy American" clauses in the Federal-Aid Highway program if they want to favor domestic firms. Federal Highway Administrator Bertram D. Tallamy has extended the deadline from July 1 (ENR Apr. 23, p. 102).

Decisions! Decisions!



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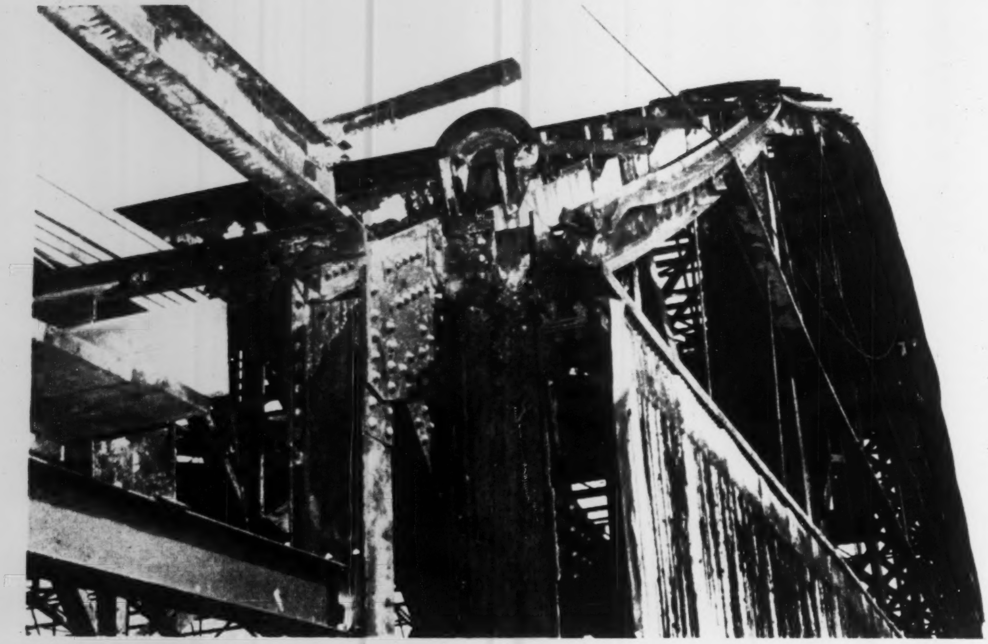
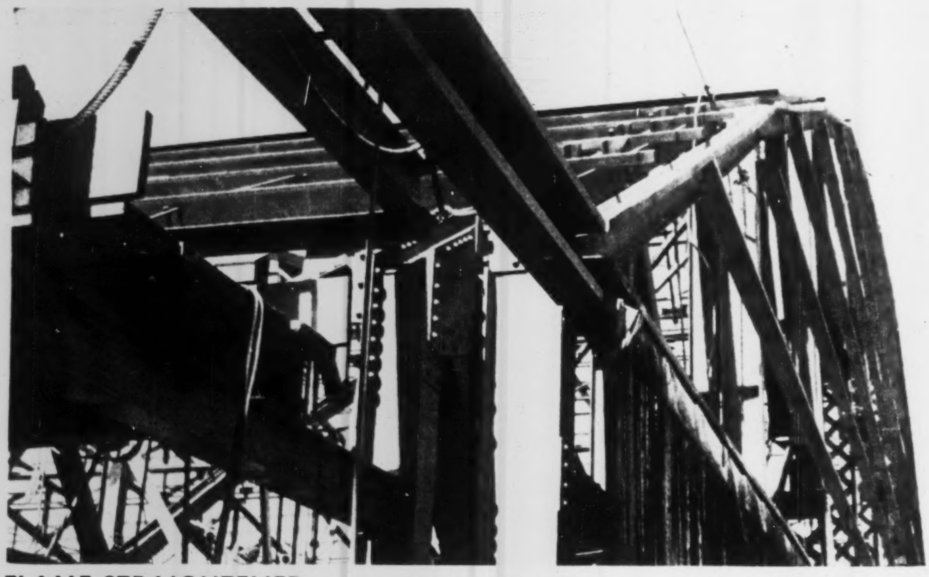


FIRE RAVAGED the steel roof framing of two hangars at McChord AFB, leaving them bent and twisted.



FLAME-STRAIGHTENED, the roof arches are able to resume their former function.

How Fire Destroyed and Fire

A contractor used fire to repair fire damage at McChord AFB, Tacoma.

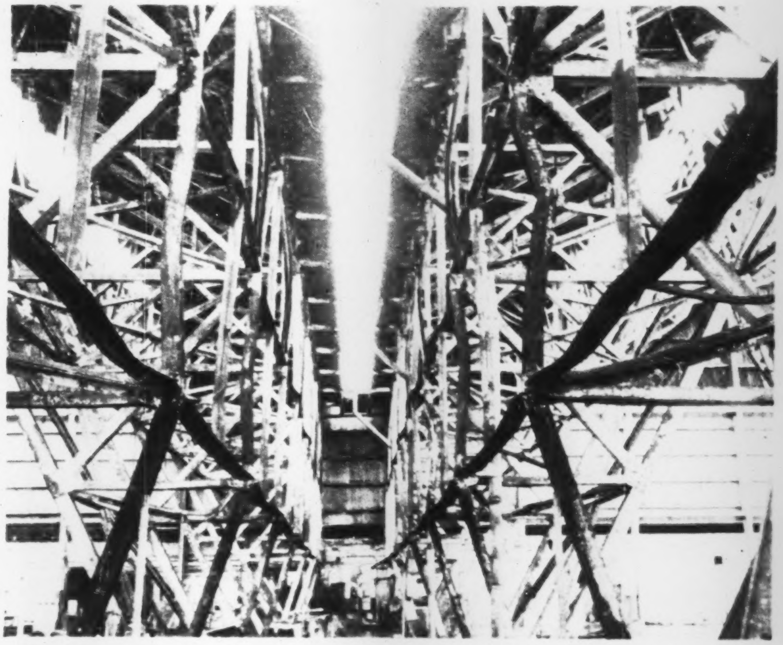
Two hangars there had been extensively damaged by fire early in 1957. They were restored to service at a structural cost of $166,848 by extensive use of a flame-straightening technique developed by Joseph Holt of Snohomish, Wash.

The repaired structural steel frame looks like new, according to Smith & Murray, Tacoma, consulting engineers, who surveyed the fire damage and supervised repairs under an A&E contract.

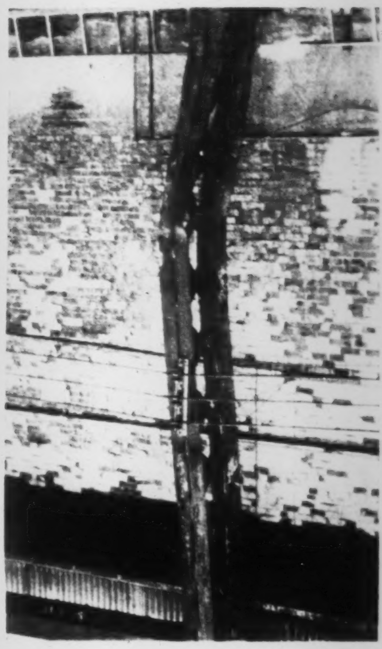
Use of the flame-straightening technique eliminated the need for dismantling and re-erecting the steel after replacing the fire-damaged members. This alternative would have cost $750,000.

• **Arched trusses**—Built in 1939-40, the two hangars comprise essentially one structure, with a total of 194,000 sq ft of floor area in the hangar portions. The frame was structural steel, each hangar having 11 three-hinged trussed arches. These spanned 275 ft with a rise of 90 ft. All truss members are 10-in. wide-flange sections.

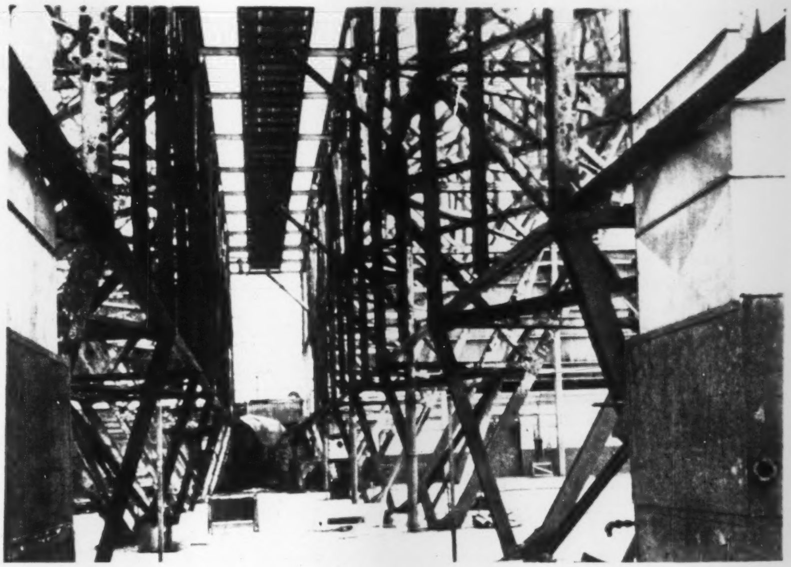
At alternate panel points, the arches



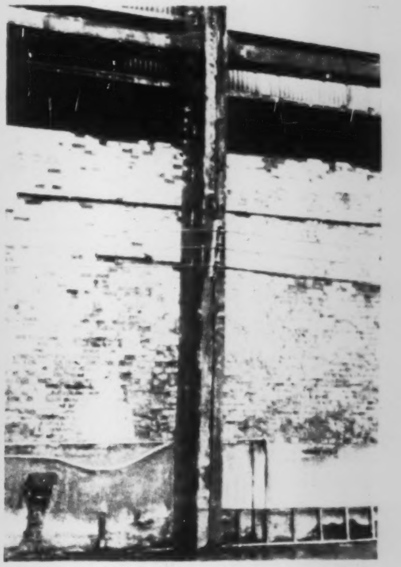
Inside, trussed arch legs were as badly damaged as the roof arches.



Outside columns, too, were bent.



Straightened arch legs are back in service, too.



So are the outside columns.

Repaired Air Force Hangars

are braced by trusses that also support 12-in., 25-lb. wide-flange beams parallel to and half-way between the arches. Purlins (8-in., 11½-lb channels) span 12½ ft between the beams and the arches.

Rear-wall framing consists of four-angle latticed columns, with channel girts above a brick wall separating a shop area from the hangars. End-wall framing consists of channel girts attached to the vertical legs of the arched trusses above the brick shop walls. Front-wall framing above the main doors consists of girts supported on hangars suspended from the arched trusses.

• **What the fire did**—Fire damage to the structural frame consisted in warping and bowing of members, and in one instance a joint failure. Damage was confined to areas where burning material heated the steel to a temperature that made it plastic.

Maximum temperature attained in the steel was estimated not to have exceeded 1,400 F and then only for short duration. Most members showed a red scale, indicating a temperature range be-

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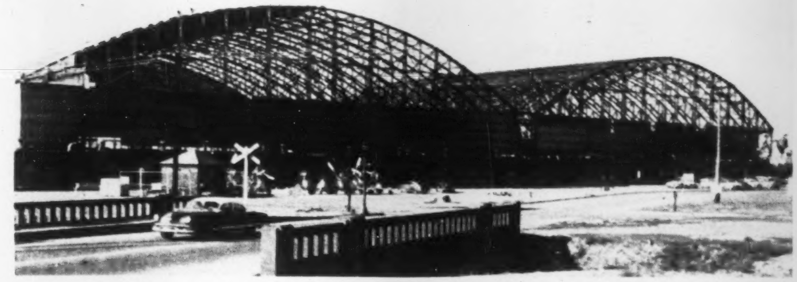
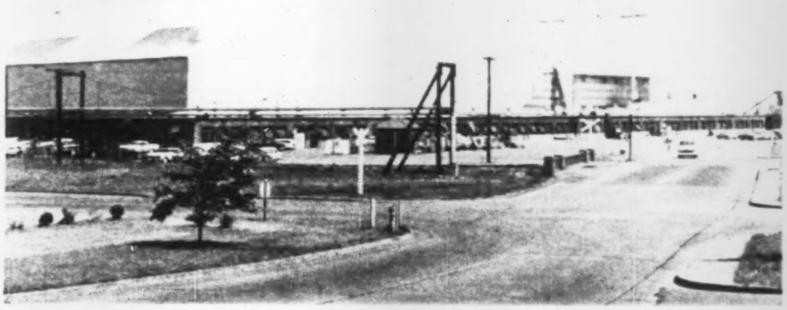
Allied Chemical



MOST OF THE WORK was done without removing damaged members from the frame.



REPAIRS COMPLETED, **the two fire-damaged hangars have been returned to use at a small fraction of the cost of replacing damaged steel.**

tween 900 F and 1,200 F. Temperatures elsewhere in the hangars were relatively low because of the large volume of the building and exhaust of hot gases through broken skylights.

In the center aisle between hangars, where a wood office and shop building burned, practically all the truss and bracing members were distorted. Many of the purlins and beams sagged in amounts up to 3 in., and the horizontal bracing in the plane of the top chord was warped. In the gables, where high temperatures were reported to have been created by the burning of asbestos-protected metal coating, virtually all the girts sagged. In one wall, two four-angle latticed columns were bent in both planes.

The joint failure occurred in the leg of an arch, where shearing of rivets let the arch down until it rested on the center leaf of the main door. Without the support of the main door, both halves of this arch would have collapsed and probably would have carried other arches in the hangar with them as they fell.

• **Damage surveyed**—The original damage survey of Smith & Murray listed all members in the arched trusses, bracing trusses and walls, together with notations indicating repairs where necessary, either by flame-straightening or replacement. The list was made by visual inspection of the various members but without measuring actual deformations.

In the actual repair work, Contractor Roy T. Earley, of Tacoma, was allowed the option of flame-straightening the members, replacing them or leaving them alone, if measured deformations were within the tolerances specified in the contract for straightness.

Many of the 1,274 members listed in the damage survey as requiring straightening were found to be within these tolerances and no repair work was done on them. Also, many of the 570 members listed as requiring replacement were flame-straightened at the contractor's option.

A total of 1,486 structural steel members were either straightened or replaced in the steel frame, out of a total of 7,327 members. Average cost was $112 per member. Replacements numbered only 46, including 32 bracing trusses, 12 girts and two door walls. Replacement was favored over flame-straightening only when determined to be more economical.

• **Straightening**—The straightening was done by five structural iron workers using torches, after instruction by Holt and under his supervision, over a period of about six months. An average of three structural iron workers were used in rigging, setting staging, shoring and other work incidental to the flame-straightening work.

In flame-straightening, the convex side of a bent member is heated, causing the member to expand and upset on this side without further distortion of the member. When cooled, the upset portion contracts and the member straightens. Successive heats are applied as necessary at the required locations lengthwise of the member.

The heat patterns are wedge-shaped, wide at the convex side and coming to a point at not more than 90% of the total width of the member in the direction of movement to straighten the member. Maximum temperature allowed is 1,200 F, when the steel is just barely red as viewed through shade 4 lenses of welding goggles.

The only direct comparison of costs of flame-straightening as compared with replacement of members concerns the 8-in. channel girts. In his original contract proposal, the contractor bid $30 each for flame-straightening the girts as compared with $80 for replacement. At the time this work was started, the contractor offered to flame-straighten 57 of the 69 girts selected for replacement, at an average unit price of $49.26—$30.74 per girt under the unit price bid for replacement.

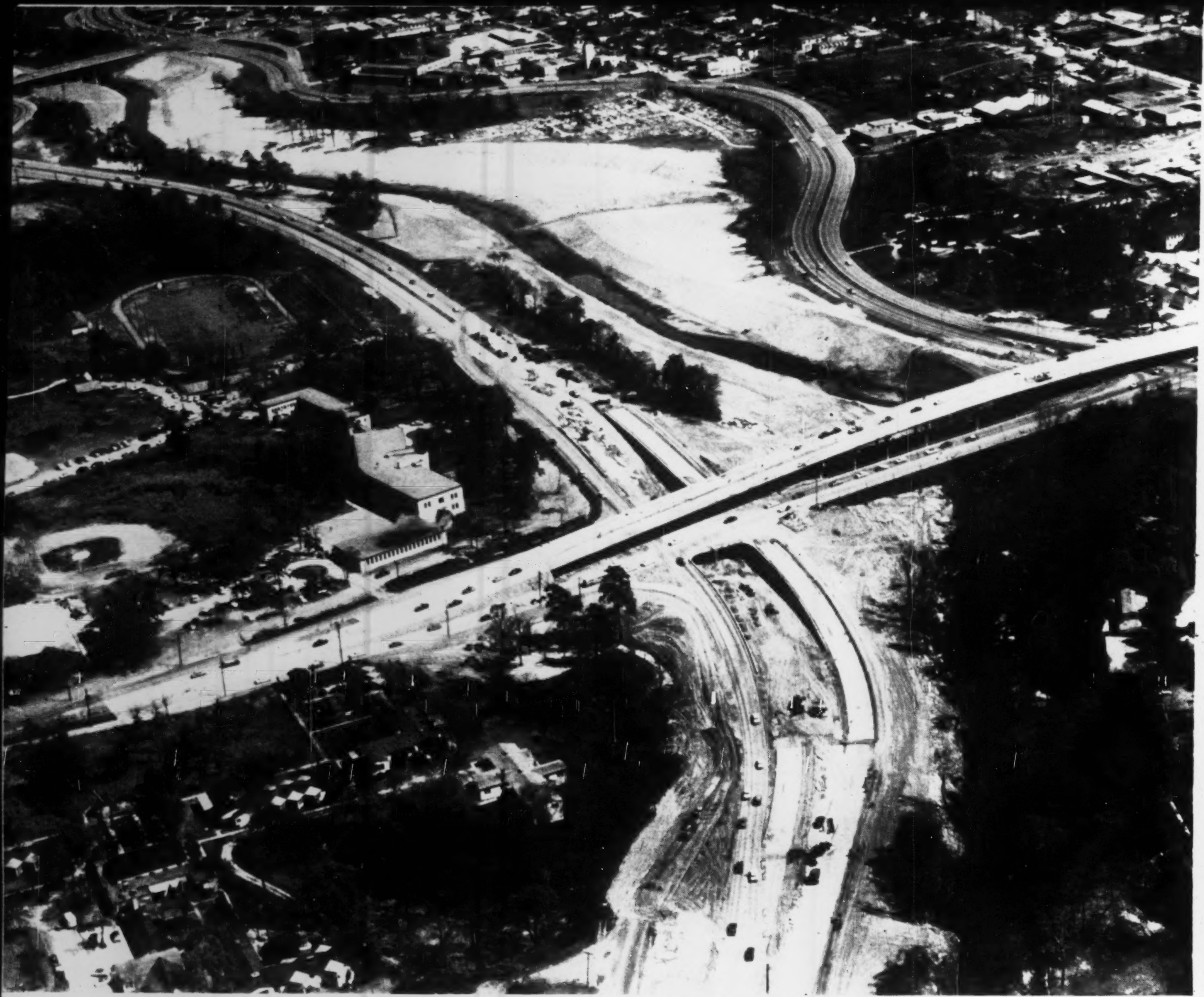
The contractor elected under his option to flame-straighten all main truss members in lieu of replacement, basing his decision on cost and risk. Whereas replacement would have required extensive shoring, flame-straightening could be done when the member was loaded, with no truss shoring. Tension members required no lateral support during straightening, and compression members required lateral restraint during straightening only to prevent further buckling while heated. This restraint was obtained by either struts and jacks or chain pulls.

Pressure sometimes was applied by hydraulic jacks or by heating with a sledge. Timber struts were used to apply supplemental forces to some of the bends, but in most cases only the application of heat was necessary.

Except for the arches at one wall, all truss members were straightened while loaded. The excepted arches were jacked up from the wall columns to take the load off the trusses.

Total man-hour cost for flame-straightening came to $11.96, according to the contractor's records. Total contract price was $495,049, including much work in addition to repairing of the frame.

Tests conducted by the Pittsburgh Testing Laboratory and the Bethlehem Pacific Coast Steel Corp. resulted in the conclusion that the fire and flame-straightening had not reduced the safe-load capacity of the steel frame.



Underpass (foreground) and overpass (center) had to be built in tight quarters.

Build Roads Over and Under, but Don't

• **The situation**—Memorial Drive and Buffalo Drive, two important east-west thoroughfares in a residential section of Houston, run parallel to one another and on opposite sides of Buffalo Bayou.

Shepherd Drive, a primary north-south artery, crosses the bayou on a four-lane bridge and intersects with the two east-west routes at grade.

Authors G. L. Cubbison and Robert S. Braden are with Freese, Nichols, Turner & Collie, the firm that designed the Houston grade separation. Mr. Cubbison is chief structural engineer. Mr. Braden wrote the ASCE's prize-winning Daniel W. Mead essay in 1957.

The traffic on Shepherd Drive amounts to 30,000 cars daily. Buffalo and Memorial Drives carry some 20,000 automobiles each day.

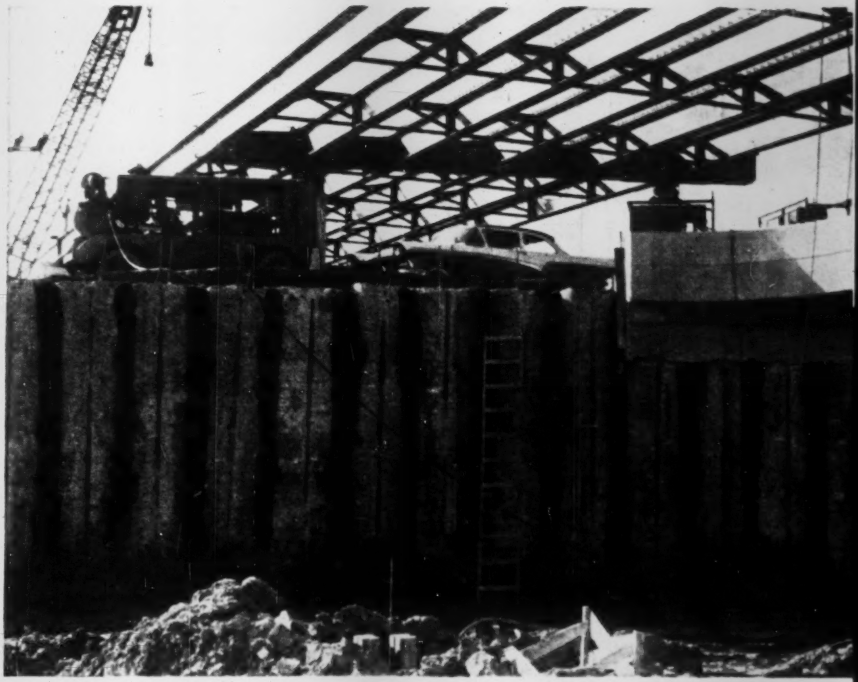
• **The problem**—Without rerouting or hindering traffic, and operating within a limited right-of-way, build an underpass for through traffic on Memorial Drive, an overpass structure for through traffic on Shepherd Drive and service roads and intersections at original grade.

• **Solution: the underpass**—Conventional retaining wall approaches and underpass structure were made impractical by limited construction space and the need to maintain normal traffic flow.

The designers circumvented both difficulties by having the walls and bridge deck built before the excavation.

The approach walls of the underpass are made up of a series of shafts drilled in the soil and filled with concrete. Design considerations called for the concrete shafts to be 65% below the underpass grade to resist overturning. Some were drilled as deep as 43 ft. Total length of the drilling was 18,000 ft. Most of the holes had to be cased, because of the water and fine sand encountered.

The concrete shafts were designed for moment on the basis of circular beams with unsymmetrical reinforcing. Heavy vertical reinforcing was placed



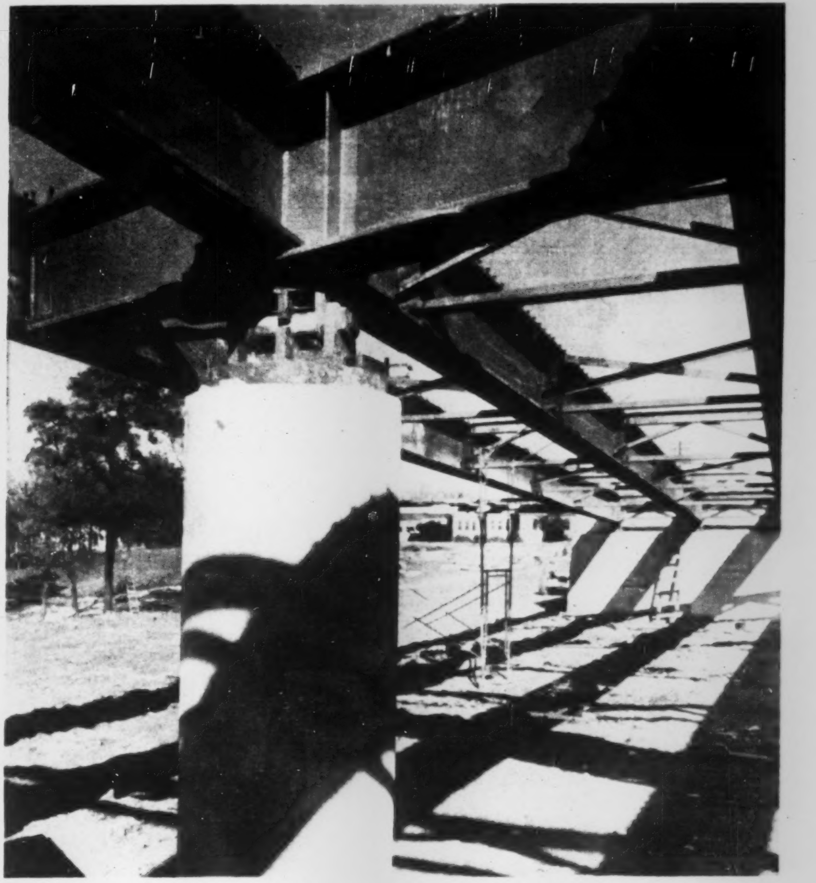
Retaining walls and bridge deck were made before excavation.

Stop Traffic

in the outside, tension portion of the shafts, but only two large bars were needed on the inside portion. These two bars serve to hold the facing wall anchor strip—a 2 in. by ¾ in. flat steel bar tied to the shaft reinforcing cage and also held by anchors embedded in the interior of the shaft.

The flat anchor bar was about 1 in. from the face of the shaft. To facilitate exposing this bar, the contractor tied a wooden strip to it before placing concrete in the shaft. After the excavation was made, the bar was easily exposed and the facing wall and form anchors welded to it.

Concrete for the underpass roof slab was placed on the ground after the



Steel pier caps were used to gain vertical clearance.

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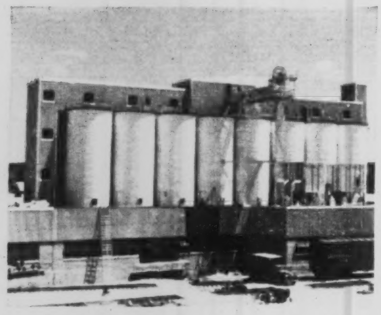
with Marietta
concrete silos



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drilled shafts were filled and before excavation had begun.

A 3-in. seal slab was first placed to serve as a form for the roof slab. Its top surface was carefully leveled and steel-troweled at the grade of the bottom of the structural roof slab. A silicone waterproofing was applied to the seal slab to prevent bonding.

After setting the reinforcing steel, the contractor placed concrete for the slab. When excavation was completed, the seal slab was pried loose, leaving a finished concrete surface on the underside of the deck.

The underpass roof slab is a two-span, continuous structure, supported at the ends by 36-in. concrete shafts, 42-in. on center, and at the center by 24-in. concrete shafts with 5-ft dia underreams, spaced 5½ ft apart.

Although the 24-in. underreamed shafts are adequate to support the underpass deck slab dead and live loadings, the load of one of the overpass bents is imposed directly on the center support of the underpass. To provide the needed load-bearing capacity for this overpass bent, a spread footing was placed below the underpass roadway grade, centered on the row of 24-in. concrete shafts. The shafts were then encased in a 3-ft-thick concrete wall that transmits the entire center load of the underpass and overpass columns to the spread footing.

A similar underpass was designed for the Buffalo Drive intersection. Although construction has been deferred, provisions were made that will simplify future work. Concrete shafts were placed at locations that will be inaccessible in the future, because of the new overpass structure. The footings of the adjacent overpass bent were placed below the grade of the future underpass.

• **Solution: the overpass**—The hazard to traffic on the existing bridge was reduced and construction simplified by building the overpass adjacent to the bridge.

Shepherd Drive overpass is offset from the alignment of the original bridge. In a long, shallow curve, the overpass leaves and rejoins the drive at points 1,000 ft on either side of the center of the bridge. The overpass is 2,100 ft long—1,200 ft for a bridge structure and 900 ft for approach ramps.

The bridge section of the overpass is of composite design, with three continuous beam units and three simple span sections. The span sections, the longest of which is 110 ft, were adjusted to fit the geometrics of the two intersections, the location of the bayou and the orientations of the bents.

Composite design was used in preference to prestressed concrete primarily because a prestressed concrete structure would have required an increase of about 8 ft in the height of the bridge and a corresponding increase in its overall length. The added height of a prestressed concrete design resulted from the required minimum clearance at some of the bents, where traffic passes beneath the pier caps.

Composite action of the concrete deck and rolled structural steel beams is used for both positive and negative moment, heavy longitudinal reinforcing being used in the concrete deck at points of negative moment. Nelson weld studs of ⅞ in. dia are used as shear connectors.

Bents for the entire structure are two-column bents with a clear distance of about 33 ft between columns. This permitted routing of service roads under the pier cap between the bent columns, avoiding awkward alignments or uneconomical spans.

Foundations for the bents are either groups of piling or spread footings, depending upon the location of the bent and the soil conditions.

At the two intersections of the overpass with the parallel roads, where vertical clearance under the pier cap is critical, steel pier caps are used instead of concrete caps. These caps span up to 37 ft between columns and extend beyond the columns up to 10 ft as cantilevered beams. All connections of the beams to the steel pier caps were field welded.

In order to insure that the proper design dead load negative moments were introduced into the beams at the steel pier caps on the continuous units, it was necessary to elevate the opposite ends of the beams before the welds were made.

Had no compensation for the dead load deflection of the beams been made, the end of the beam would not have fit flush with the web of the pier cap and no dead load negative moment would have resulted.

But by jacking the opposite end of the beam before it was welded, the proper design negative moment was introduced as the beam was again lowered into position.

Freese, Nichols, Turner & Collie, Houston consulting engineers, with McClelland Engineers of Houston as soil consultants, designed the three-level grade separation project. It was built by Brown & Root, Inc., Houston general contractors, in 10 months—eight months less than was originally expected. Bel-Toc Foundation Co., also of Houston, drilled the shafts. Total construction cost was $1.6 million.

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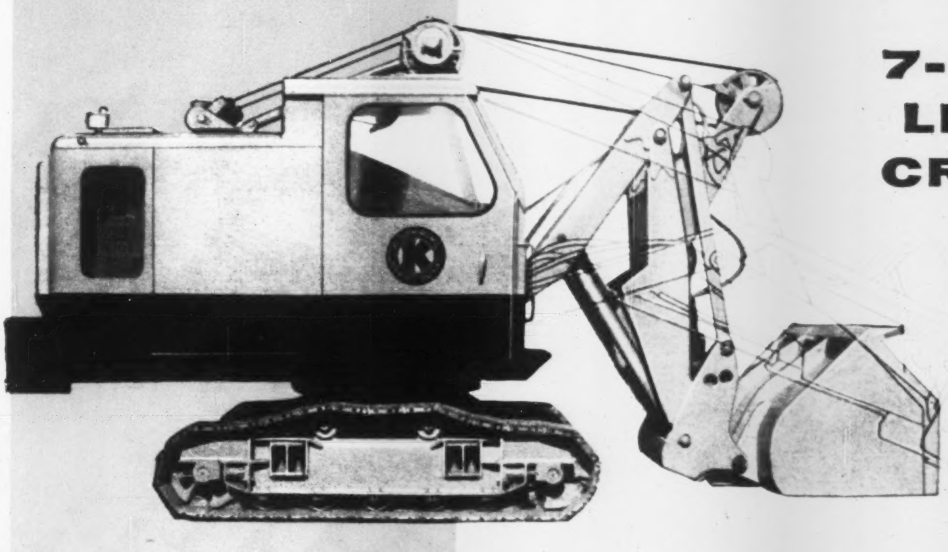

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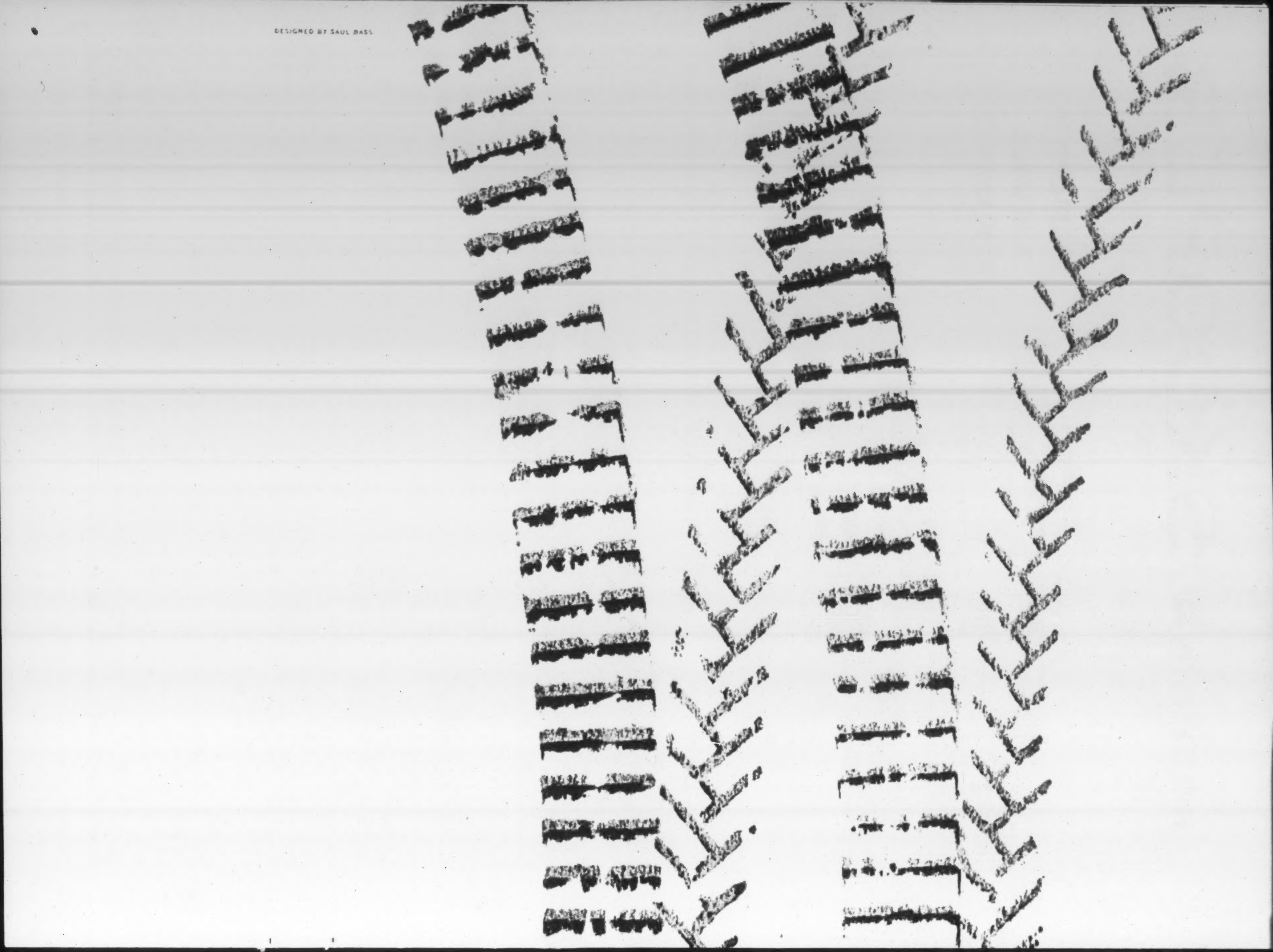
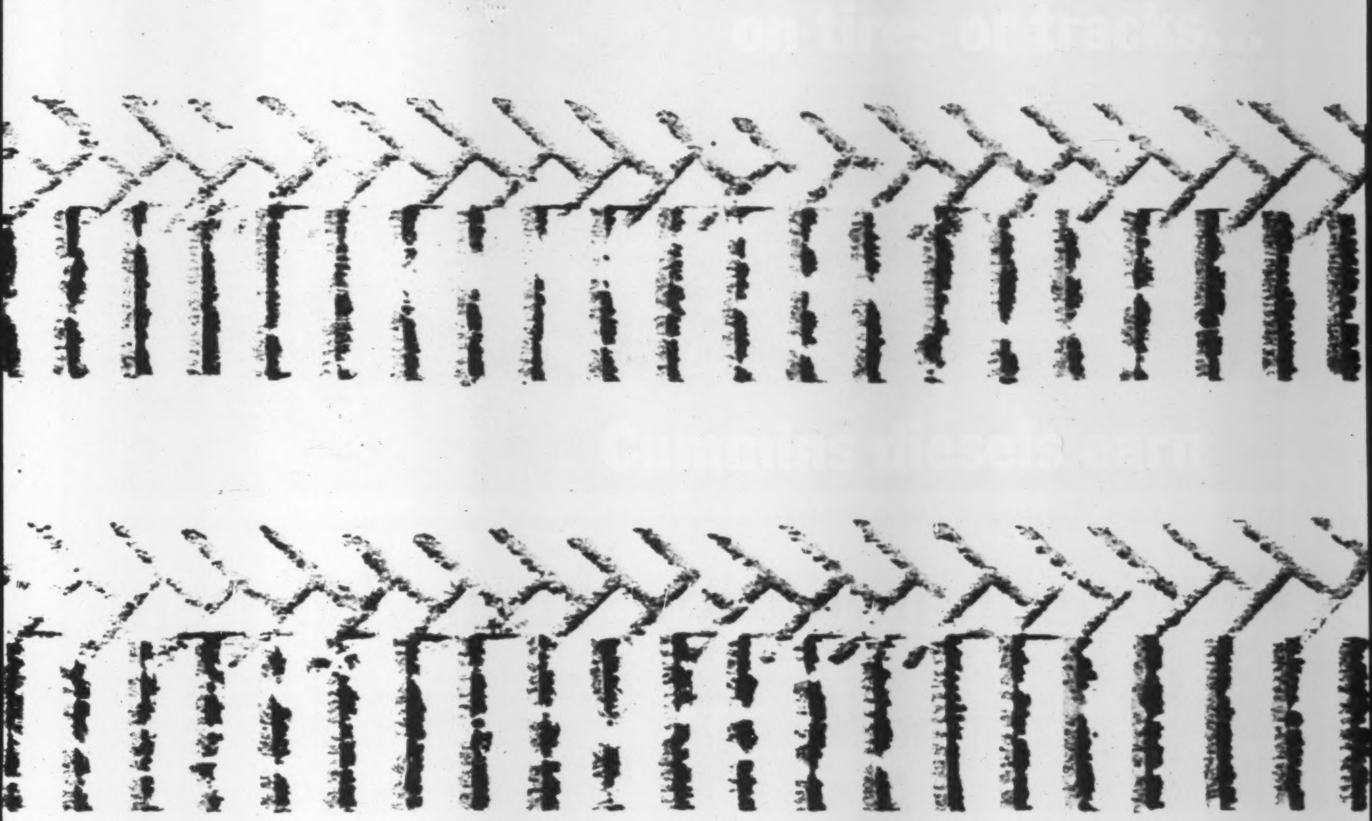

DESIGNED BY SAUL BASS



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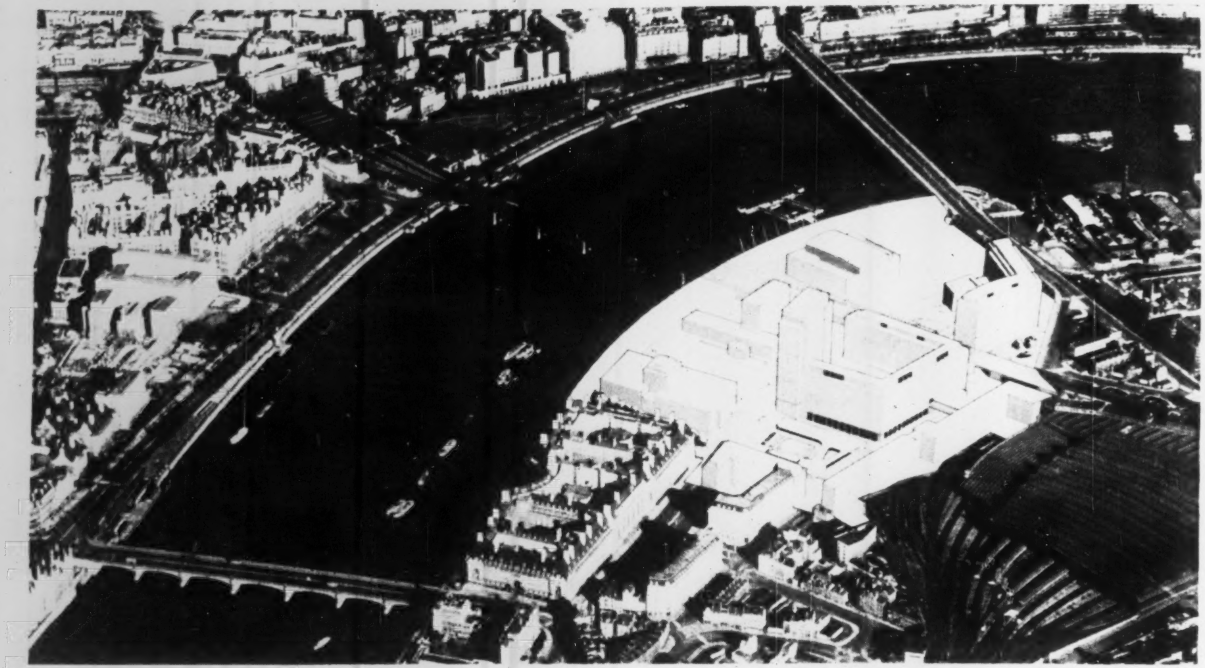


Shell headquarters on the Thames in London consists of two buildings on a site split by a viaduct.

Digging Foundation Around Bridge

Subway tunnels under the site and a bridge approach bisecting it led to unusual foundation construction for the Shell Petroleum Co., Ltd., headquarters now being erected in London.

It will be one of the largest building complexes in the British capital. Its 26-story tower will be the tallest office structure in London, where the horizon is still dominated by the 365-ft-height of 250-year-old St. Paul's Cathedral.

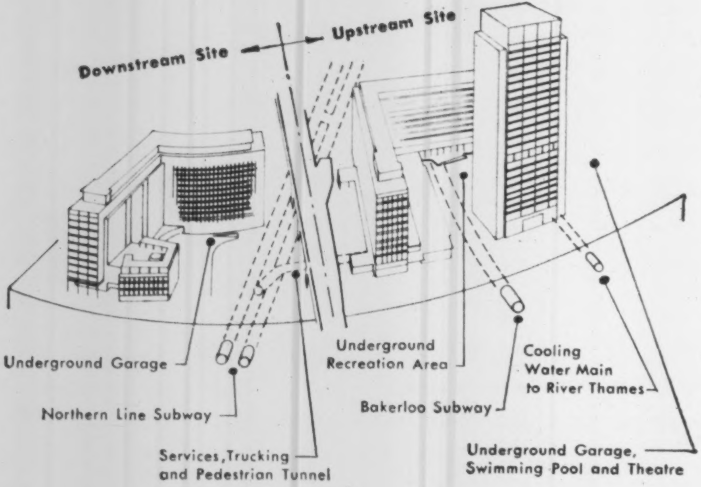
Located on a bank of the Thames River, on the grounds of the 1951 Festival of Britain, the complex is divided into "upstream" and "downstream" sections by Charing Cross Railway Viaduct.

The upstream building will be an 11-story, roughly U-shaped, reinforced concrete structure, with the 338-ft-high steel-frame tower at one end. The downstream building will be an L-shaped, 11-story reinforced concrete edifice abutting a smaller, rectangular three-story concrete structure.

Basements will extend under the entire $7\frac{1}{2}$-acre site.

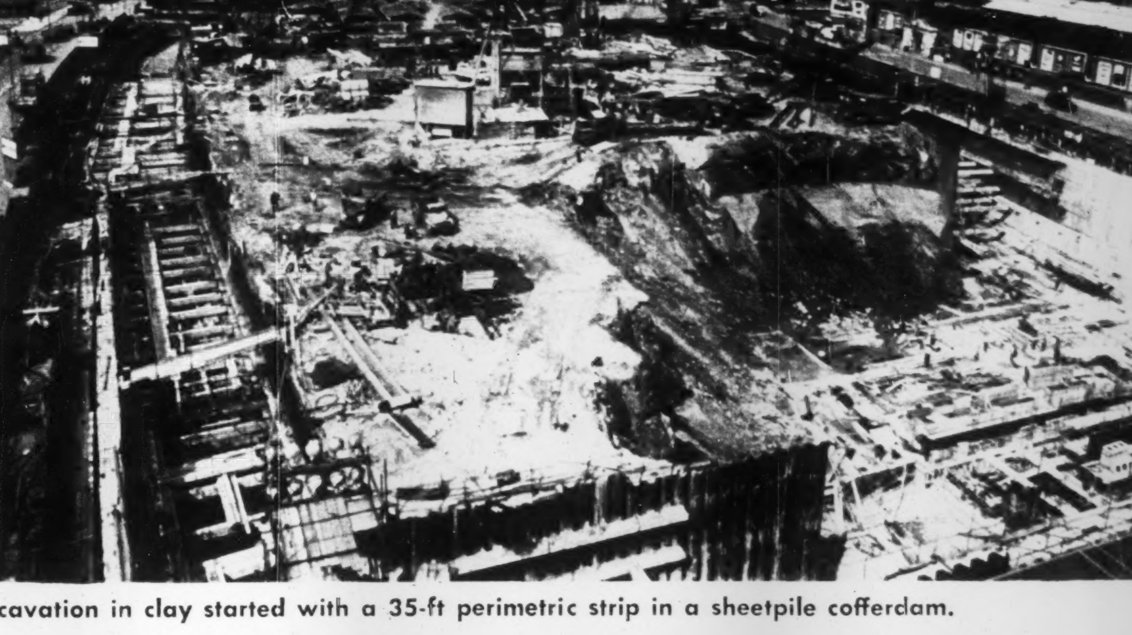
The buildings are founded on "London clay," which underlies most of the city. This is a stiff, fissured, overconsolidated Eocene clay, about 100 ft thick under the Shell site.

For most London buildings, which seldom exceed 10 or 12 stories, the clay offers no special difficulty when a nor-


Downstream Site
Upstream Site
Underground Garage
Northern Line Subway
Services, Trucking and Pedestrian Tunnel
Underground Recreation Area
Bakerloo Subway
Cooling Water Main to River Thames
Underground Garage, Swimming Pool and Theatre

What Made Foundation Construction Tough

- **Excavation of waterfront site had to be kept dry.**
- **Subgrade could heave when excavated.**
- **Tunnels between buildings pass under viaduct.**
- **Subway tubes cross the site.**
- **Unequal-height buildings load foundations unevenly.**



Excavation in clay started with a 35-ft perimetric strip in a sheetpile cofferdam.

Approach and Subway Tunnels

mal raft foundation is used. But in a complex with the varying loads of this one, it presents a problem because of differentials of heave and settlement.

• Subway problem—Complicating the problem are the subway tunnels in the clay stratum. A Northern Line, with inbound and outbound tunnels at the same level, passes well below the bottom of the basement floor of the downstream building and is not endangered by the relatively light loads.

But Bakerloo Line tubes represent a different situation. The two tunnels are one above the other, and the top one has only 5-ft clearance below the foundation slab of the upstream building, which applies greater and more varied loads.

The possibility of damage to the cast-iron Bakerloo Line tunnels was twofold: (1) upward deflection of the tunnels due to the initial heave within the clay on removal of overburden; and (2) distortion due to changes in distribution of radial pressures acting on them.

For the downstream building, it was found that a raft foundation would be sufficient; joints between sections could allow for differentials, which would not become intolerable.

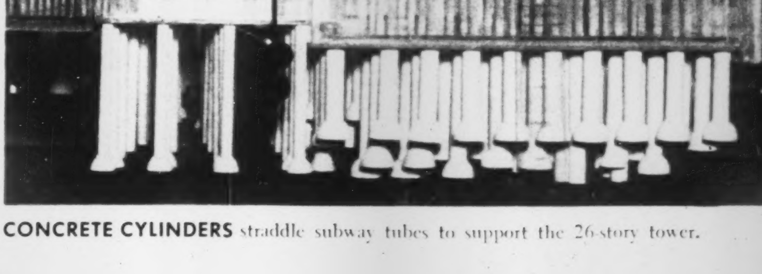
But for the upstream building, a raft foundation would have these problems: The tower unit is weighted at one end by attachment to one leg of the 11-story U but not at the other end. It would develop a tip calculated at 2 in. in 50 years. And a 7-in. differential would develop over the same period between the tower (which would sink) and adjacent deep basements without superstructure (which would be raised by the heaving of the clay, since they would weigh less than removed overburden).

To avoid this tilt and extreme differential, the tower is founded on reinforced concrete cylinders. The cylinders vary in diameter from 4½ to 7 ft, and in depth below foundation slab from 50 to 75 ft. They are belled out at the bottom to 11- or 15-ft dia.

Foundation cylinders are also used for that part of the structure—basement area plus part of the U-shaped, 11-story building—over the Bakerloo subway line. Their principal function is to carry the weight of the structure to the clay below the tunnels, to avoid changing the stresses in the clay around and above the tunnels.

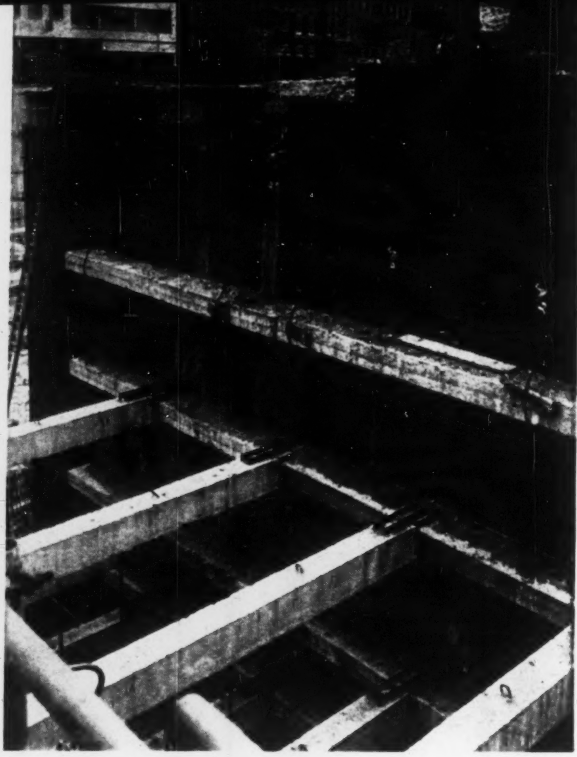
The cylinders in the vicinity of the tunnels also serve as legs of staples, minimizing initial heave of the clay on relief of overburden. Excavation over the tunnels was done in 30-ft-long strips. When a 30-ft strip was excavated, the contractor concreted the foundation slab before proceeding to the next strip. The slab, joined to the cylinders, restrains the heaving of the clay.

(*Turn the page*)

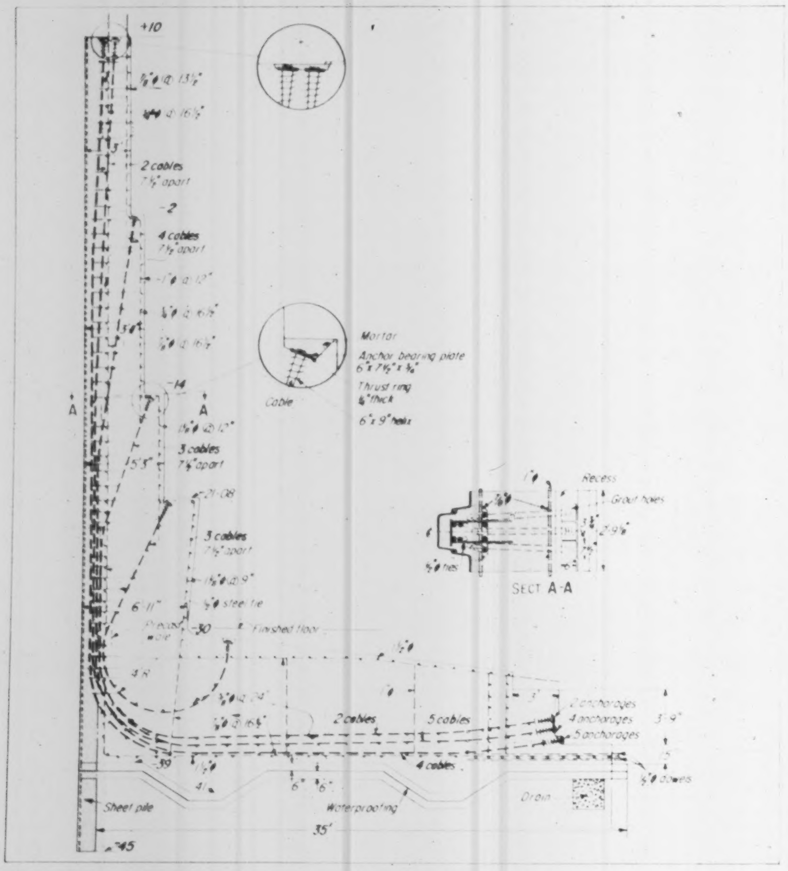


CONCRETE CYLINDERS straddle subway tubes to support the 26-story tower.

AUGER drilled holes up to 75 ft deep for foundations.



BRACING of 35-ft-wide cofferdam was precast concrete.


+10
2 cables
7½" apart
-2
4 cables
7½" apart
Mortar
Anchor bearing plate
6"x 7½" x ¾"
Thrust ring
⅛" thick
6" x 9" helix
Cable
A
A
-14
3 cables
7½" apart
5'5"
-21-08
3 cables
7½" apart
steel tie
6'-11"
Precast pile
-30
Finished floor
4'8"
2 cables
5 cables
2 anchorages
4 anchorages
5 anchorages
3'-9"
3'
-39
4 cables
41
6"
6"
dowels
Drain
Waterproofing
Sheet pile
35'
-45
Recess
Grout holes
2'-9⅛"
ties
SECT A-A

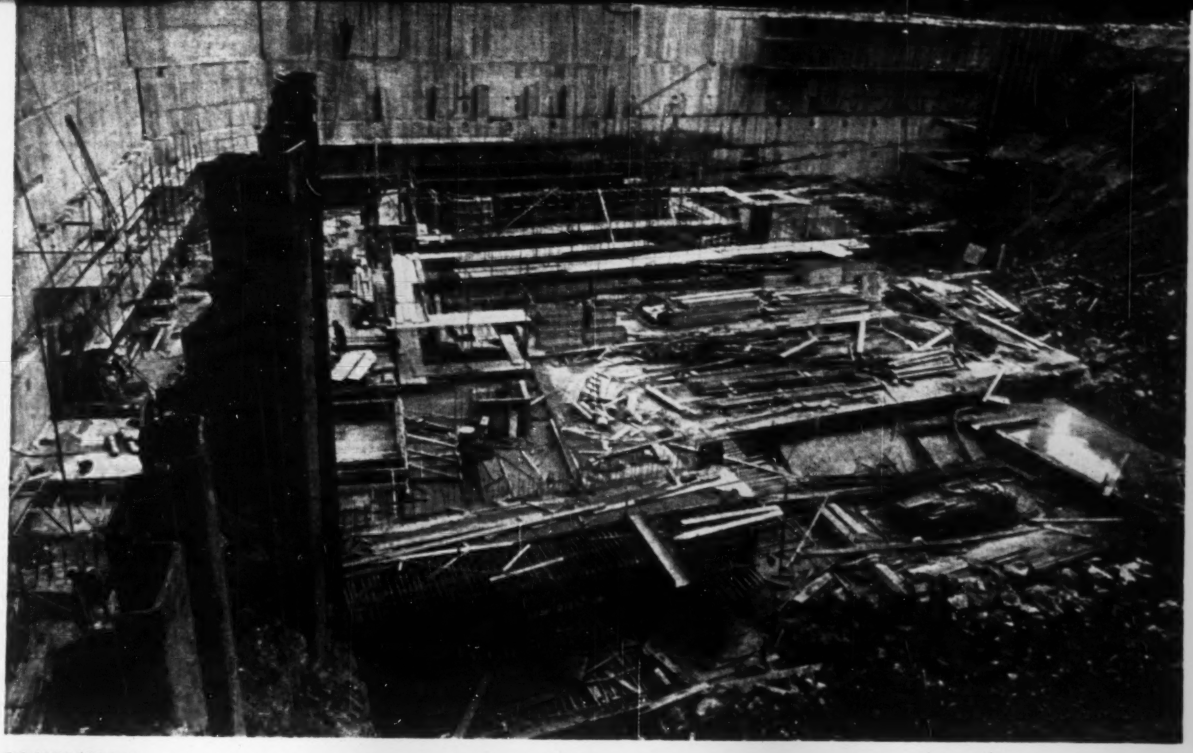
FOUNDATION WALL was prestressed by cables starting in the toe and ending at three stepbacks in the wall.

It was impossible to avoid some rise of the tunnels under the site, but the precautions taken kept it within the tunnels' longitudinal tolerance. Tunnels are made up of 18-in. cast-iron rings, with a 12-ft inside diameter and a 6-in.-thick wall (including ribs). With bolts joining the rings loosened, slippage between rings gave sufficient flexibility for the calculated amount of upward movement.

Design calculations of heaving of the clay were checked by three test holes, one near the edge of the upstream site, the other two at intervals toward the center of the excavation. Concrete plugs in the lined holes were checked for movement as overburden was removed. The movement was within the calculated limits.

• **Connecting tunnels**—In addition to this complication with the subway tunnels, the designers were faced with a different sort of problem with the multiple arch Charing Cross Railway Viaduct.

Two 10x20-ft (inside dimensions) tunnels, passing under the viaduct, will connect the downstream and upstream buildings—one for foot and vehicular traffic, the other for utilities. The abutments of the bridge approach are part brick, part concrete, and rest on a waterbearing gravel-and-sand stratum above the London clay. The danger was that construction of the tunnels—just below the abutment bases—would cause water flow from under the abut-



COMPLETION of prestressed concrete foundation wall permitted interior excavation, removal of inner line of sheetpiles.

ments. This, in turn, would cause settlement that could seriously damage the old—and already cracked—arches.

The danger was minimized both by design of the tunnels and the construction techniques used. The tunnels were made to pass below two adjacent bridge arches. Each of the tunnel walls consists of a row of reinforced-concrete piles in drilled shafts, placed so that the piles are in contact to check water flow.

For each tunnel, after the two rows of piles were inserted, a concrete slab was cast that became the tunnel roof. It served as a strut, holding the piles stable when the tunnel was dug. A concrete floor, put in after the passageway was excavated, completed the enclosure. It also acts as a strut between the piles.

As a further precaution, the water-bearing gravel in the immediate vicinity was chemically consolidated by injection before any work was started.

• Problems from side pressure—The depth of the basements and the heavy side pressure from the London clay and strata above it required unusual design and careful excavation.

Foundation walls averaging about 50 ft in height and the adjoining 28 ft of foundation slab were designed as a unit, a portion of the slab becoming the toe of the wall.

Excavation was carried out within cofferdams. To form them, sheetpiles were driven along the exterior of the building and a parallel line about 35 ft in. The piles were driven to about 5 ft below the bottom of the foundation slab.

When the lines of sheetpiles were in place, overburden was removed between them to a depth of 8½ ft. Then, precast concrete wales and cross bracing were erected to brace them. Excavation was then carried down to 18 ft and more concrete wales and cross bracing were put in place. The process continued to the full depth.

(Precast concrete bracing was used throughout, rather than timber or steel. Width of cofferdams—averaging about 35 ft—would have necessitated closer centers and greater sections with timber, obstructing working room. Steel would have been difficult to obtain in the quantities required at the time construction started and would have cost more.)

In general, the foundation slab consists of 6-in. unreinforced concrete topped with dampproofing cloth; another 6-in. concrete layer; then a reinforced slab above this from 2 to 10 ft thick, depending on the loads to be carried.

The toe slabs and foundation walls were prestressed as a unit. Tendons started at the toe and curved up the wall to terminate at each of the three stepbacks in the wall and at the top. Each prestressing cable contained twelve 0.276-in.-dia steel wires, with ultimate strength of about 220,000 psi.

(Story continued p. 65)

JACK tensioned prestressing wires in the wall. Wedges anchored them.

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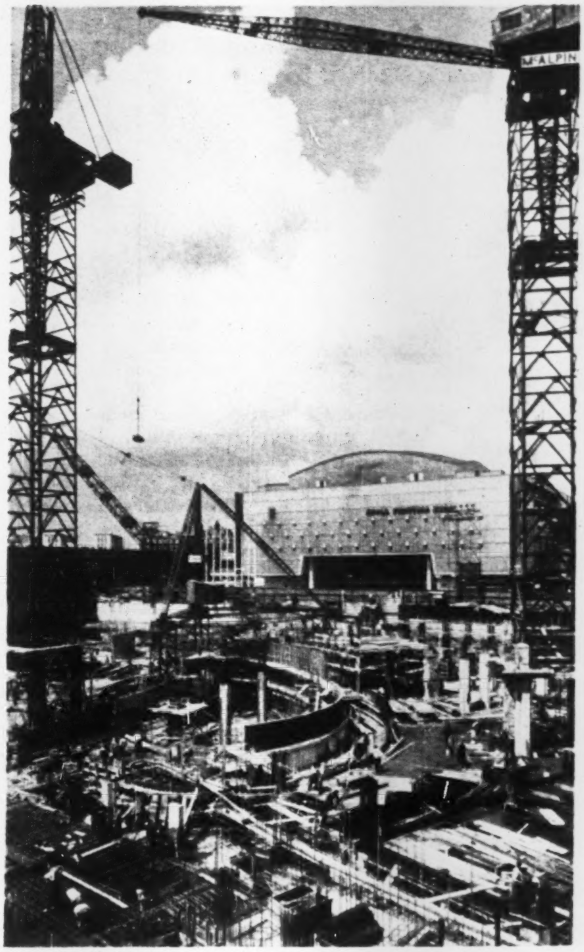
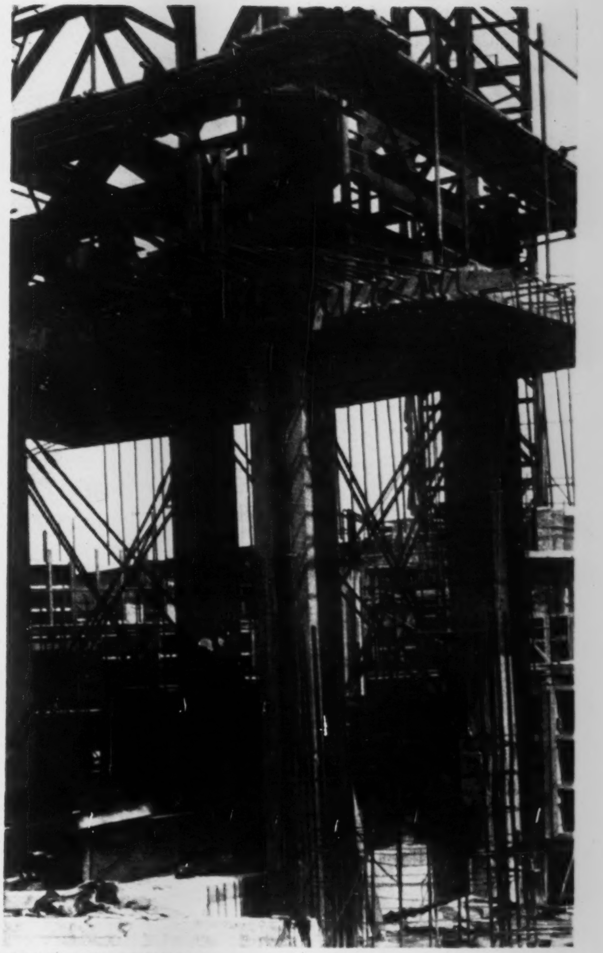


TOWER CRANES were set on platforms in the excavation to erect the superstructure.



CRANE PLATFORMS were supported on prestressed concrete columns, which prevented overturning.

Each wire was stressed individually to about 150,000 psi and anchored with conical steel wedges.

After the wall and outer strip of foundation slab were completed, the inner line of sheetpiles was removed. The outer line, waterproofed before erection of the wall, was left permanently in place. This contributed to the stability of the wall and helped with the site's serious water problem. The extension below the base of the slab checks percolation that could damage the joint between slab and wall.

After each portion of wall and connected foundation slab was finished, excavation proceeded toward the interior by normal methods with only one restriction: To guard the wall stability, the designers specified that the top of the excavation slope be more than 60 ft from the farthest point of completed prestressing.

There was an exception to this procedure at the southern end of the upstream basement. To prevent sliding of the walls in this area, a 25-ft-wide strip along the toe of the wall was excavated in 40-ft-long increments. Each 25 x 40-ft portion of the foundation slab was concreted before excavation began on the next. When this 25-ft strip was completed on the three exterior sides (one 340 ft long, two 117 ft) of the garage area, work proceeded normally toward the interior.

Concrete, which was pumped into place, had to meet these strength specifications: 3,300 psi for main slabs, 5,000 psi for retaining walls and prestressed portion of floor slab; and 4,000 psi for structural members.

Six multimotored, five-ton steel-tower cranes with 120-ft jibs were used for erection of the buildings, four in the upstream area and two in the downstream area. The 137-ft-high tower cranes were set on platforms 24 to 33 ft above the foundation slab. Thus they could be removed later without leaving holes in ground-level and intermediate basement floors.

Each platform was supported on four prestressed concrete columns. The platform's concrete slab later became an integral part of the ground floor; and slabs halfway up the upstream structures became part of a second-basement floor.

When the cranes were removed, the concrete columns were dismantled. The same thing could have been done with steel columns but at greater cost, the contractor says.

Tensioned steel cables were assigned the double tasks of prestressing the concrete columns and tying down the free-standing towers. Anchor bolts of the length necessary to reach from tower base to foundation slab would have been subject, during gale loadings, to extension that would have permitted the tower base to flap on the slab. Stressing of the cables—a total of 120 tons at each column—was enough to prevent this, and without guying of the towers. Five 12-wire cables, extending through the grillage under the towers, were used at each column.

Prestressing cables were embedded in the columns supporting some of the crane platforms but were on the outside of the columns for the others. Placement within or without the con-

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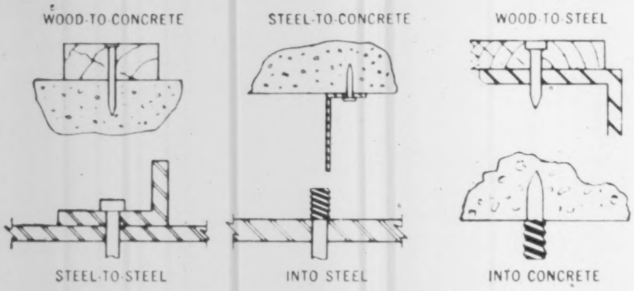

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crete depended on the location of bolt holes in the tower grillage. Where the cables were outside the concrete, the columns were encased in brick for protection.

• **Diesel hammer drives piles**—For driving sheetpiles, the contractor used a German diesel hammer (the Delmag D.12) and found it had significant advantages in both cost and effectiveness for this job over equivalent steam or air-operated double-acting hammers.

Compared with other hammers capable of the same driving speed, the diesel costs average out to about half, figuring initial cost, which is higher, and cost of operation, which is considerably lower. Fuel consumption of the motor, which is set on the hammer, was about 2 gal per hr.

The diesel hammer proved mechanically highly reliable—largely because of a simplified fuel-injection system that wasn't thrown out of adjustment by vibration. Fuel was fed into a cup, where it was atomized by the contact of the ram at the bottom of its stroke. The explosion threw the ram up 6 to 8 ft (depending on the quantity of fuel injected). Return stroke was the same as with any free-fall hammer (ENR May 15, 1958, p. 54).

The hammer delivered 50 to 60 blows a minute. Energy per blow was 22,500 ft-lb. Weight of the ram was 2,750 lb and total weight of the hammer, 4,950 lb.

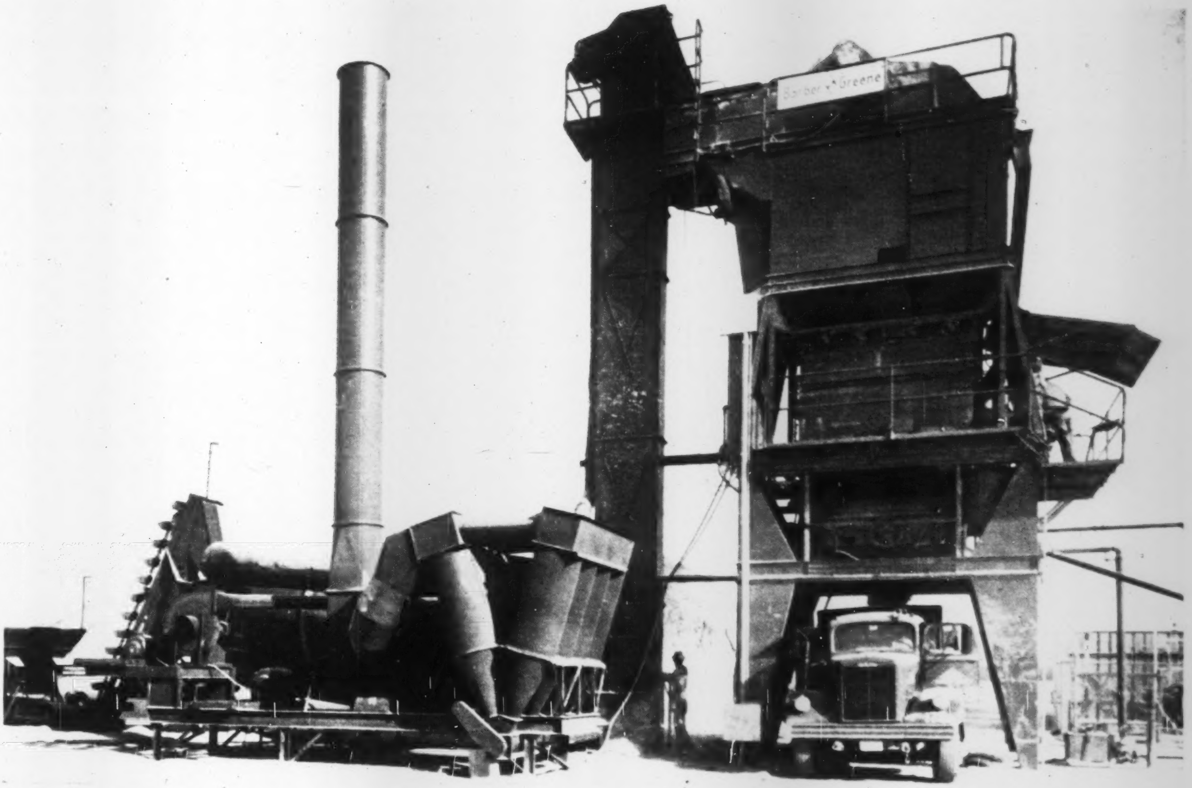
Cofferdam sheetpiles were driven the initial 12 to 20 ft (depending on soil condition) with a light air hammer. The light hammer made alignment control easier. Also, the diesel hammer was more efficient when the driving was hard (into the clay) than when light, the contractor says.

Log guides designed by the contractor permitted driving the piles without a frame or hanging leads.

The hammer was found to be easy on the pile tops, doing little damage even when the piles were driven almost to refusal.

• **Drilling the shafts**—Except for those in the vicinity of the subway tubes, holes for foundation cylinders were drilled with augers at a rate of about 10 ft an hour. After the bottoms were belled out, the bells were inspected by closed-circuit TV. A reinforcement cage was then lowered into place and the shaft concreted. The London clay is suited to this type of operation, since it will stand for short periods without support.

The augers were installed on 1½-cu yd and ¾-cu-yd crawlers. These were adapted to provide variable forward and reverse speeds, independent drum



BatchOmatic kept pace with 23,000-ton airport job, served several other contractors at the same time. Write for BatchOmatic bulletin.

BatchOmatic easily meets strict high-tonnage specs ... serves drive-in trade simultaneously

Fill a high-tonnage asphalt contract for a big airport job meeting strict specs . . . meet varied needs of several other projects at the same time. This plant did just that and according to the contractor, "The Barber-Greene BatchOmatic we used on this project met requirements set forth in contract specifications with ease."

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- **Simultaneous measuring** of all aggregate sizes—eliminates the human element in achieving accuracy and maximum capacity.
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- **Instant, easy inspection** of aggregate gradation and weight.
- **Available in various sizes.** Complete line of components for every mixing requirement.

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59-12-A

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ANOTHER EXAMPLE OF HOW Fenwal CONTROLS TEMPERATURE . . . PRECISELY

. . . Shell's London Hq

motion for hoisting and fluid coupling in transmission.

Because of the need for special care to avoid damaging subway tunnels, cylinder holes adjacent to them were drilled by hand with pneumatic spades. The holes were lined with precast concrete sections as drilling proceeded.

• Part of master plan—The Shell Headquarters will be the first of several new buildings to be erected on the former Festival Grounds under a master plan of the London County Council. Others projected include a hotel and a theater.

The Shell complex will make an impressive landmark viewed from across the Thames. The buildings will be faced with limestone, with marble and a light-green slate in some areas for decorative effect.

Walls will be omitted from the ground floor of two wings of the upstream buildings, leaving concrete columns exposed and permitting free passage of pedestrians into the courtyard.

Spacing of structural columns (on 18 ft centers) was designed to give maximum internal flexibility. Outer columns are incorporated into outer walls where they do not subtract from interior space.

Windows (set 4 ft 6 in. apart in the tower and on courtyard exposures, 2 ft 6 in. apart elsewhere) will have double panes of ¼ in. plate glass with Venetian blinds between them on those facades receiving sunlight. All window units will be horizontal-pivot-hung, so that the outside surfaces can be cleaned from the building interior. They will be framed with teak, except for the ground floor of the tower section, where the frames will be bronze.

The building will be one of the few large structures in London that is air conditioned throughout. The system will combine panel heating and cooling from the ceiling with low-pressure fresh-air distribution.

For intake and discharge of cooling water for the heating and ventilating plant, a 900-ft tunnel extends from the upstream portion of the site under the Thames. The tunnel, with internal diameter of 10 ft, is 65 ft below ground level, within the London-clay stratum. The inlet is in the bed of the Thames, to comply with regulations forbidding obstruction of river traffic. The tunnel was excavated with pneumatic spades, and lined with precast concrete.

Architect for the new Shell building is Sir Howard Robertson, of the firm Easton & Robertson. Scott & Wilson, Kirkpatrick & Partners are structural consultants. Sir Robert McAlpine & Sons Ltd is the general contractor.

The project is scheduled for completion June 1961.

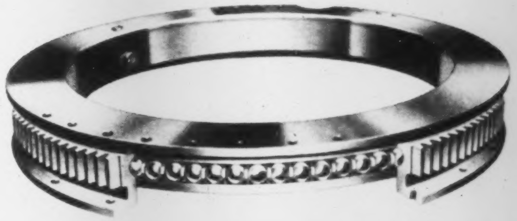
10th Lorain for T. W. Kidd speeds moving 80,000 yards of rock on $1,800,000 flood control dam at Oxford, Mass., for the Corps of Engineers. The 85-A digs ledge cuts ranging from 10' to 40' deep, 20' to 60' wide and 1000' to 2500' long for spillways and diversion channels.

ROCK-STEADY SWING ONE REASON FOR STEADY ROCK PRODUCTION OF LORAIN 85-A

The single ball race, Shear-Ball turntable mounting of this 2½-yard Lorain 85-A shovel is one of the reasons T. W. Kidd, Jr., of Fall River, Massachusetts, says, "Finest rock machine I have ever owned . . . rugged efficiency with real economy."

Shear-Ball mounting provides a smooth, rock-steady swing, reduces downtime for maintenance and frequent lubrication common to roller type design. Trouble free operation keeps the Lorain 85-A on the move to pile up high production regardless how tough the digging.

This exclusive Lorain feature has been proven in nine years of field service throughout the world. You can have this important advantage on your rock shovel too. See your Lorain distributor for full details and a demonstration.



Lorain Shear-Ball turntable mounting. 69 hardened high-alloy chrome steel balls carry the load as they revolve freely on sealed, precision-ground, and hardened races. The balls lock the turntable to the mounting so no center pin, nut, centering gudgeon, or any type of turntable roller or exposed roller path is needed. All the adjustment, maintenance and lubrication problems of this type of design are eliminated.

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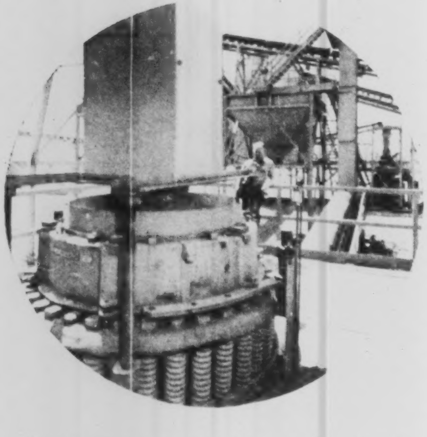
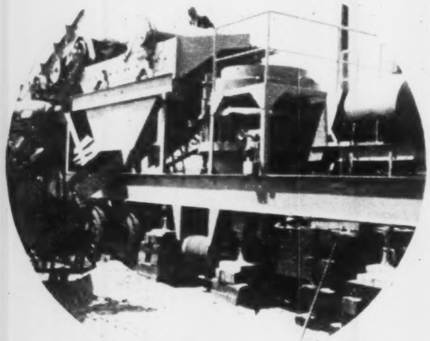
For in aggregate and sand production . . . *as in all of the great ore and industrial minerals operations the world over* . . . no record equals the performance of Symons Cone Crushers that have so consistently produced, economically and efficiently, great quantities of finely crushed product resulting in higher profit per ton per hour.

Before you submit *your* next bid, get full information about Symons Crushers.



FOR STATIONARY PLANTS

Symons Cone Crushers are the choice of leading contractors and producers for primary, secondary and finer reductions in all types of aggregate operations. Available in both Standard and Short Head types, Symons Cones are built in sizes from 22" to 7' in diameter, for capacities from 6 to 900 or more tons per hour.



FOR PORTABLE PLANTS

Symons Cone Crushers are being used in increasing numbers for portable and semi-portable crushing plants. Illustrated is a typical Cedarapids Intermediate Scalping Unit, using a 4-ft. Symons Cone Crusher. Unit is serving a large Midwest sand and gravel producer.

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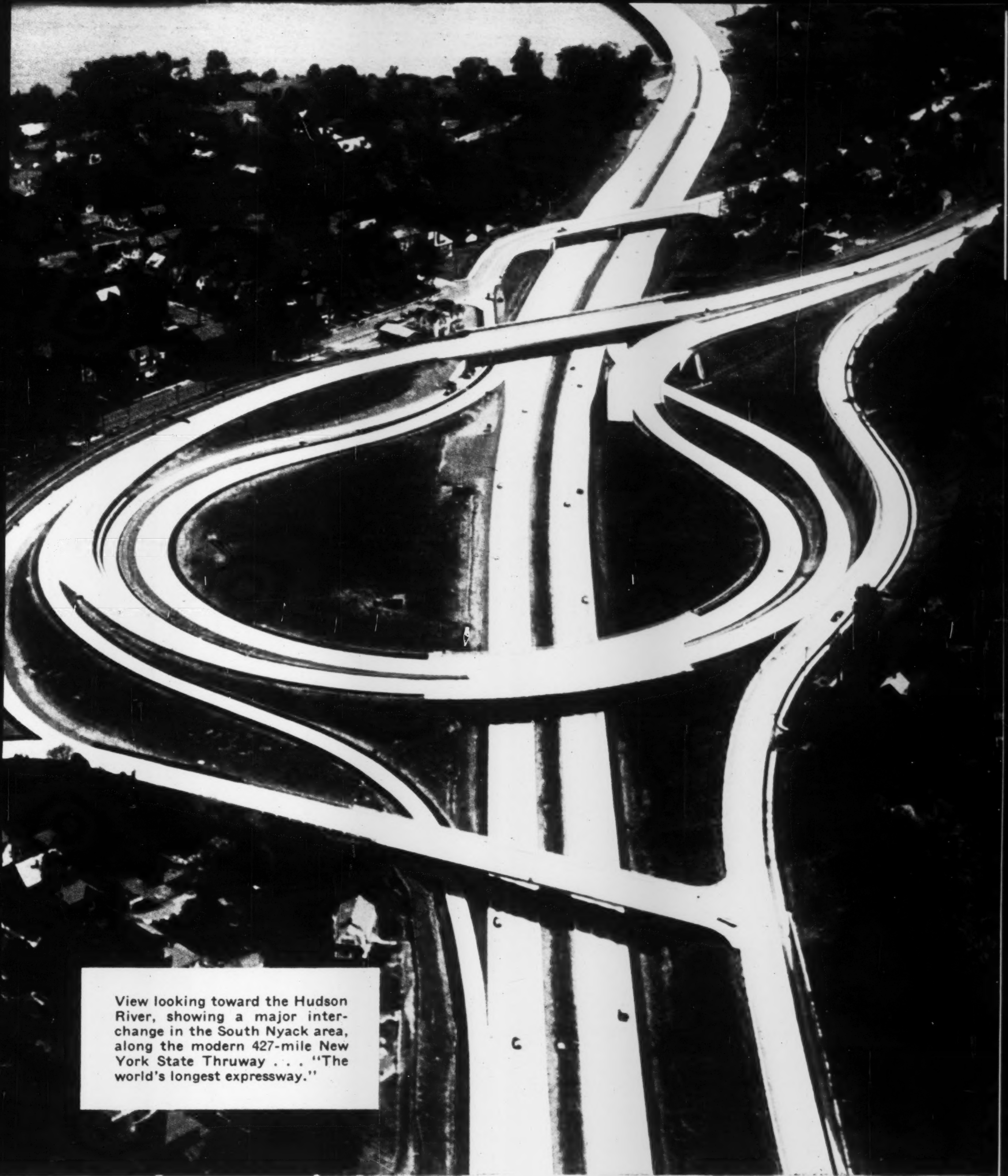

View looking toward the Hudson River, showing a major interchange in the South Nyack area, along the modern 427-mile New York State Thruway . . . "The world's longest expressway."

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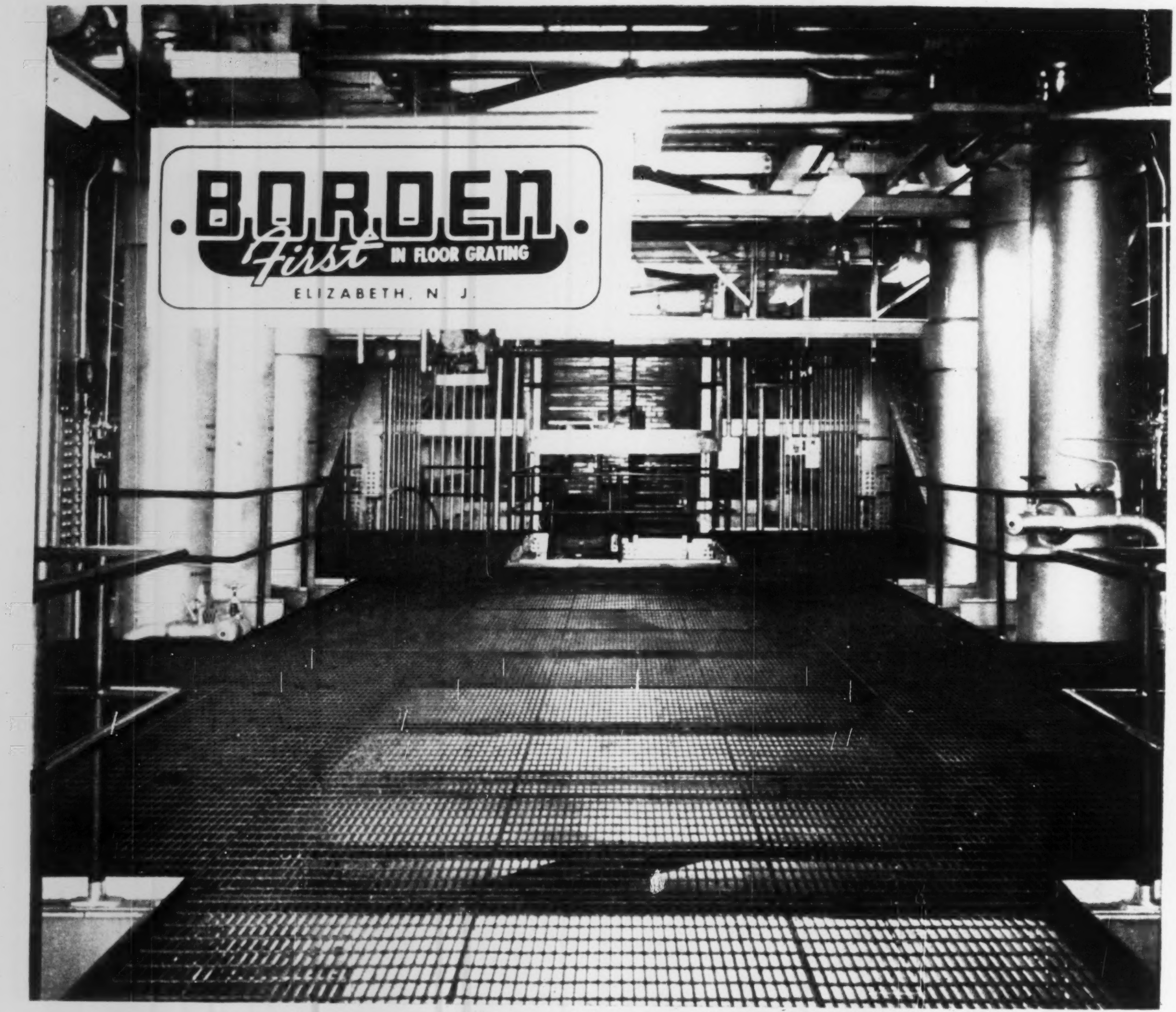

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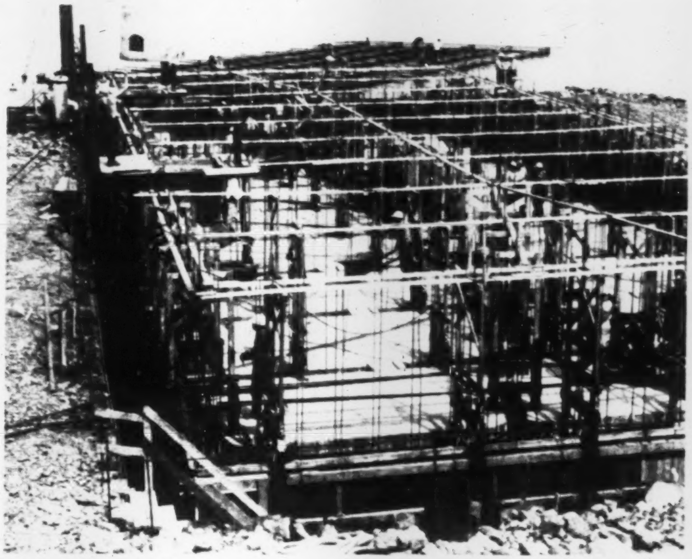
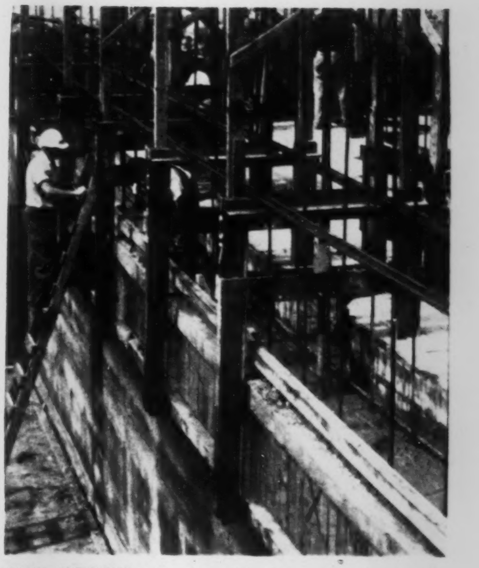
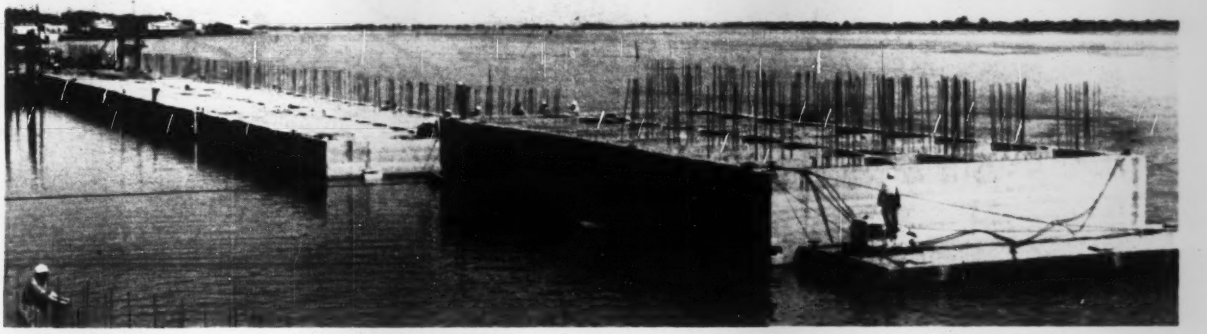


HUGE BOXES of reinforced concrete are begun in drydock. When their walls rise to 12 ft they are floated and completed in stream.



SLIP FORMS permit rapid placement of concrete in box walls.



COMPLETED BOX is towed to project site and warped into position. Once in place, it is flooded and sunk.

Box Wharves Built Ashore and Afloat

The Foundation Company of Quebec, Ltd., is using production line techniques to construct reinforced concrete boxes for the modernization of the Montreal harbor front.

Each concrete box is 112 ft long, 46 ft wide and more than 40 ft high. Each weighs about 4,000 tons.

They are begun in a drydock, completed as they float to their destination and then warped into position like ocean liners. Finally, they are sunk and filled with ballast to form the wharf.

For current production a drydock is located upstream from the job. It is a 3,300-cu-yd excavation holding back the St. Lawrence River on three sides with sheetpiling buttressed by rock. The fourth side is a 25-ton floating door.

During construction of the box foundation, the drydock door keeps water out. When water ballast is pumped out of the double-walled door, it floats clear and permits removal of the box.

Each box is constructed with 1-ft-thick reinforced concrete floor, side walls and numerous partition walls that divide it into room-sized cells for structural strength.

When the concrete walls reach a height of 12 ft, the box is floated free of the drydock. At this stage, it draws 9 ft of water. As it floats alongside the drydock, the walls are built to a height of 42 ft, 9 in.

The completed box draws 28 ft of water. This is adequate clearance for it to be towed downstream and warped into position. Once in place, the box is filled with 10 tons of rock and stone to settle it firmly on a cruhsed stone bed.

Rapid construction of the reinforced concrete boxes is made possible by the use of slip forms, moved upward by hydraulic jacks. The forms can rise at a rate of 8 ft per hour.

In the present job the concrete boxes lie in 40 ft of water, their tops just above the low water mark in Montreal Harbor. A concrete cope wall will rise 20 ft above the boxes to enclose rock and dirt fill to the wharf surface. The project calls for a rock enclosure wall to run the 450 ft from the upstream end of the new wharf to the present shoreline. Behind this wall will lie 14 acres that will be reclaimed with landfill to extend the dockside area.

The boxes, installed by Foundation Company of Quebec Ltd., will form sections 94 to 96 of the Montreal Harbor front. The wharf will extend 12 miles along the St. Lawrence when completed.

For more on versatile Foundation Co., see p. 144.

2nd Quarterly Cost Roundup

Cost Outlook: Equipment, Money

Basic costs of major construction materials and labor will not change much in the next six months. Nearly all 1959 wage increases will be in effect by July 1.

A steel price increase at the mills appears to be the only likely increase in major materials prices.

Lumber prices, up 7% so far this year, should stop climbing. A moderate decline is possible if higher interest rates crimp home-building plans.

The ENR 20 Cities Cost Indexes have nearly reached the values forecast by ENR for December '59. The Construction Cost Index has risen 2.5% since January 1 to a record 797.94 as of June 4, based on 1913=100. The ENR Building Cost Index has increased 2.4% since January to 549.21 on June 4, also based on 1913.

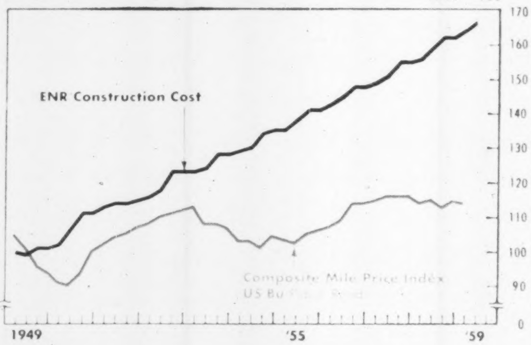
Assuming a rise in steel prices of about $4 per ton at the mill and including deferred wage increases, the Construction Cost Index should come close to ENR's forecast of 805 by December 1. The ENR Building Cost Index, however, may end up at about 556 next December 1, higher than the 551 value forecast earlier.

The outlook for other cost factors is not so bright.

Construction equipment prices will probably move up another notch late this year because of increased steel and labor costs.

Further increases in interest rates are likely to come on top of the recent advances. This means working capital and equipment loans will be more costly for contractors. For owners, it means the final cost of construction and the financing costs will be higher.

Highway Bid Prices



High Productivity, Slim Profits

Highway bid prices have been sliding while basic costs have climbed to successive new highs.

Thus contractors are offering a gigantic bargain sale. In effect, they are giving away to the states most of the fruits of their big gains in productivity. Price competition compels them to carry on the "giveaway" program if they are to keep crews and equipment working.

Not only are more competitors in the market, but the capacity of each is growing. So each needs added volume at today's low profit margins.

This competition will hold the lid on 1959 prices and add mileage to the highway construction dollar.

Cost Features

Bargain Year for Highway Construction 76-77
More work, yes. But also more contractors, more capacity. Result: Competition is driving bids down to where they were in the third quarter of '56.

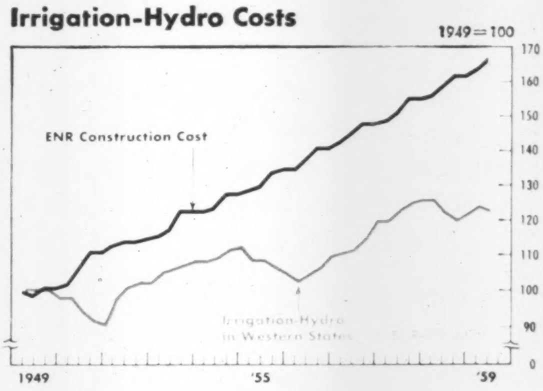
Bid-Price Trends in 28 States 78-79

Irrigation-Hydro Costs Dip 80, 81
Here again, despite rising costs of materials and labor, increased competition is lowering contractors' prices.

New York School Costs Drop 81
Contract prices of new elementary schools fell 13.5% in the fourth quarter of '58. Prices of elementary school construction are now at the lowest point in more than two years.

Contractors' Building Prices Level Off 82
The uptrend in contractors' prices leveled off this spring—but it's only a pause until the full impact of this year's wage increases are felt.

and Steel Prices Will Rise

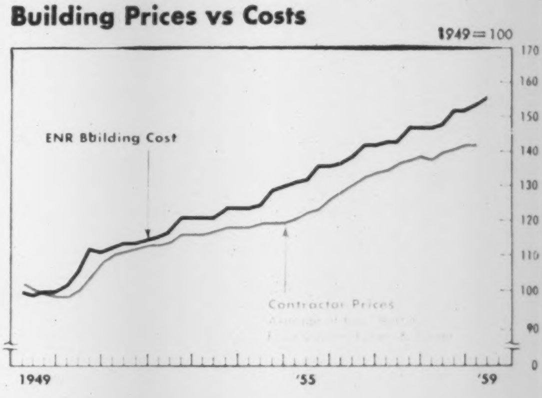


Competition Reverses Cost Rise

The upturn in irrigation-hydro construction costs in late 1958 and early this year didn't stick. Rugged competition for work took costs down a peg in April, the U. S. Bureau of Reclamation index shows. This dip pulled the index 2% under its peak of early '58.

The drop in hydropower construction business and rapid progress toward completion of huge dam projects started in the West two or three years ago is sparking sharp price competition for this type of work.

An example: low bid in May of $88.9 million on Wanapum Dam, in Washington State, was 35% under the engineering estimate.



Selling Prices to Follow Cost Rise

Building contractors' selling prices will rise with basic costs in 1959. Though the available contractor price indexes showed a pause this spring, they are now on their way up again under the driving force of increased wage rates and some materials price advances.

Latest values of two contractor price indexes—Aberthaw and Fruin-Colnon—show them rising even faster than basic costs measured by the ENR Cost Indexes. Furthermore, each of those two indexes is moving up at a faster clip than it did last year.

This probably reflects the strong 1959 rebound in new building contracts.

Cost of Construction's Basic Four 'M's...... 86

The weight of growing public attention to inflation may slow rising prices, but won't stop the trend.

Materials: Steel prices will go up. Other materials will be stable for awhile.

Manpower: Although contractors have had some success holding wages down this year, they remain the big force behind the cost push.

Machinery: Slow but steady increases are coming at a time contractors are investing heavily in equipment.

Money: Interest charges moved up again in May, making it still more expensive to finance all types of construction projects.

Lumber and Glass Prices in 22 Cities........ 88

Highway Prices and Indexes..........91, 93, 94

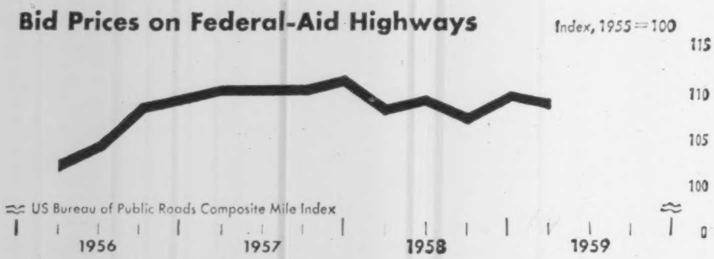
Indexes chart the trends in prices of major highway bid items is selected states.

Where the Building Dollar Goes........... 97

Highway Price Trends

Bargain

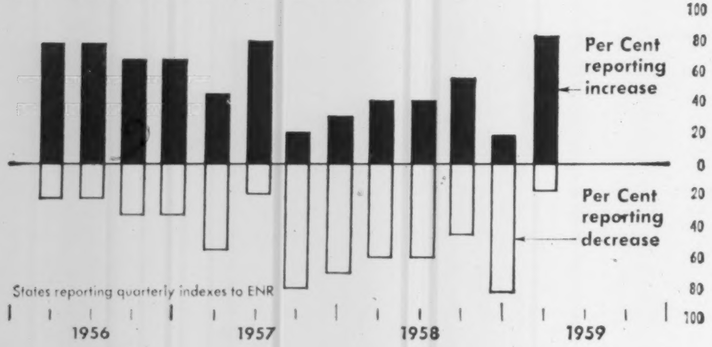
Bid Prices on Federal-Aid Highways



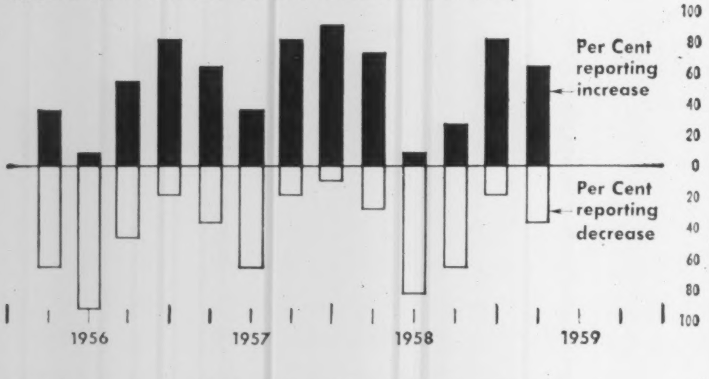
Contractors have cut their bid prices on new highways back to what they were in the summer of 1956 — despite an increase of 13% in basic costs of materials and labor.

The reason: increased productivity by highway contractors, forced on them by the sharp competition for available work.

Bid Price Trends in 11 States

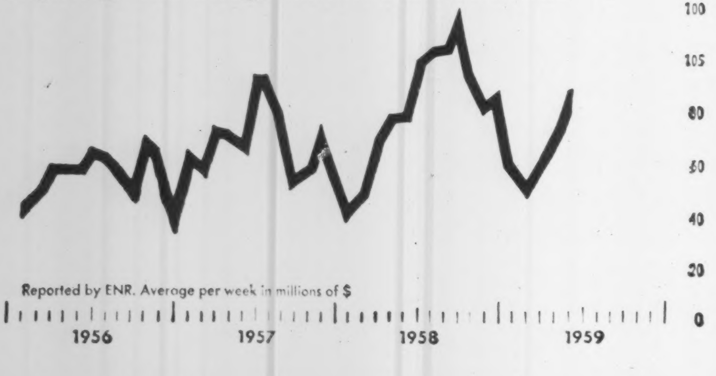


Trend in Number of Bidders in 11 States



Average number of bidders per project has increased — there are more new contracting firms, and the older firms are looking for more business.

Highway and Bridge Construction Contracts



There's a record volume of highway and bridge construction coming up for bids, but contracting capacity is rising even faster.

Year for Highway Construction

A big increase in the number of active contractors and an even greater rise in capacity make the 1959 highway market an arena of deadly competition. Out of this arena the states are drawing huge savings in highway construction dollars.

The reason: Price competition among contractors is bringing bargain prices to the highway bid tables.

Contractor's bids on federal-aid highway projects have dropped after peaking out in the last quarter of 1957. Whereas bid prices rose during the first year and a half of the Interstate Highway construction program, which started in July 1956, they have dropped back to about the same as in the third quarter of 1956. The U. S. Bureau of Public Roads Composite Mile Price Index dipped to 167.6 in the first quarter of this year, based on average bid prices in the years 1925-29 as 100. The index is 2% under the record high set in the last quarter of '57.

More dramatic evidence of how competition is driving down bid prices comes from 11 state highway departments, which report their own bid price indexes to ENR each quarter. First quarter 1959 index figures are down from recent highs recorded for all of these states—as much as 32% (see table below).

• Trend varies by states—Though the BPR first quarter index was slightly higher than a year ago, bid price indexes were below a year ago in six of the 11 states. Prices were up in the other five states. This points up the fact that the trend in highway bid prices varies widely among states, reflecting the degree of competition which, in turn, usually mirrors the amount of new work available.

The much narrower range of the fluctuations in the BPR index compared with the individual state indexes reflects the offsetting increases and decreases among the states.

All but two of the 11 states reported rising bid prices in the first quarter, while the BPR index dipped. This probably reflects the record volume of new work under way during the first quarter and the emergence of a new cost push—rising wages, materials and equipment prices.

Last year saw a record volume of highway and bridge awards. This includes a spurt in awards in the second half for projects qualifying for the emergency "D" federal-aid funds. As this "bonus" is worked off, contractors are likely to become hungrier for new work.

This means more intense competition for work coming up for bids during the rest of this year.

• Productivity giveaway—Though this year's highway and bridge awards got off to a mediocre start, ENR forecasts a new all-time high to top last year's record by 10%. With this prospect of a rising market, it might seem that bid prices would steam upward and close some of the gap that has opened between bid prices and basic costs. While the BPR index was only 0.3% higher in the first quarter of this year than in the third quarter of 1956, basic costs climbed about 13% between September '56 and this month, as measured by the ENR Construction Cost Index.

However, highway contractors held down their prices in the face of rising costs by raising productivity. This has been accomplished by greater mechanization, by keeping crews and equipment working steadily and by moving them swiftly from job to job. But the big increase in the number of competitors and highway contracting capacity has forced contractors to keep profits low and pass on the savings to their customers, the state highway departments.

• Number nearly doubles—The number of contractors signing up highway contracts has increased at a spectacular rate between 1959 and 1958. Contractors doing $100,000 or more annually in all types of construction and signing up highway work increased by 82%. The number doing bridges increased by 89%, according to ENR's annual analysis contract awards.

In 1958, there were 3,151 of these contractors taking on highway jobs, a rise of 36% in the three years of the expanded highway program. Those doing bridge work increased by 64% to 1,122 during this period.

This growth has caused the rise in the number of bidders at highway and bridge lettings (table below).

While most states plan to increase their volume of highway and bridge awards in 1959 and 1960, there are 10 states that have already cut back on awards or intend to do so next year. As contractors in these states go farther afield to maintain their volume of work, competition will intensify in states where available work increases, as well as in those where the market tapers off.

Highway Bidding Trends

Reported by state highway departments

Bid Prices

How the First Quarter '59 Compares with . . .

Contractor Competition

Average Bidders Per Project

State	. . . Previous quarter %	. . . year ago %	. . . previous high %	1958 Q1	1958 Q2	1958 Q3	1958 Q4	'59 Q1
California	−9.4	−10.6	−22.2 (Q1 '57)	9.3	5.4	5.5	6.3	8.2
Colorado	+4.9	+3.7	−7.8 (Q2 '57)	9.9	8.6	8.4	9.6	7.8
Florida	+2.1	+18.3	−2.6 (Q3 '58)	7.1	5.5	5.0	5.9	5.3
Idaho	+7.8	−7.8	−31.9 (Q3 '57)	7.1	7.5	5.3	7.0	7.1
Michigan	+0.2	−6.9	−12.7 (H1 '56)	. .	6.3	5.7	6.9	8.5
Nevada	+6.5	−6.1	−15.6 (Q2 '57)	8.8	6.6	5.7	7.1	5.7
New York	+8.5	−11.0	−14.2 (Q1 '56)	7.0	6.0	6.0	5.0	8.2
Oregon	+15.2	+21.3	−0.3 (Q2 '57)	10.4	6.2	5.9	8.4	6.9
South Dakota	+3.4	+20.8	−1.4 (Q2 '56)	10.0	5.8	6.8	6.4	6.9
Texas	+1.6	+7.1	−3.1 (Q3 '58)	6.3	4.7	5.7	5.9	6.4
Washington	−8.5	−13.2	−18.6 (Q2 '57)	9.1	6.0	4.9	8.0	9.8

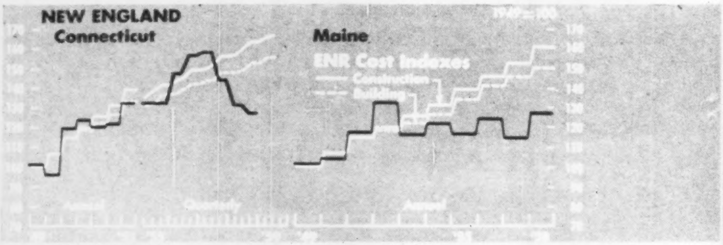
2nd Quarterly Cost Roundup

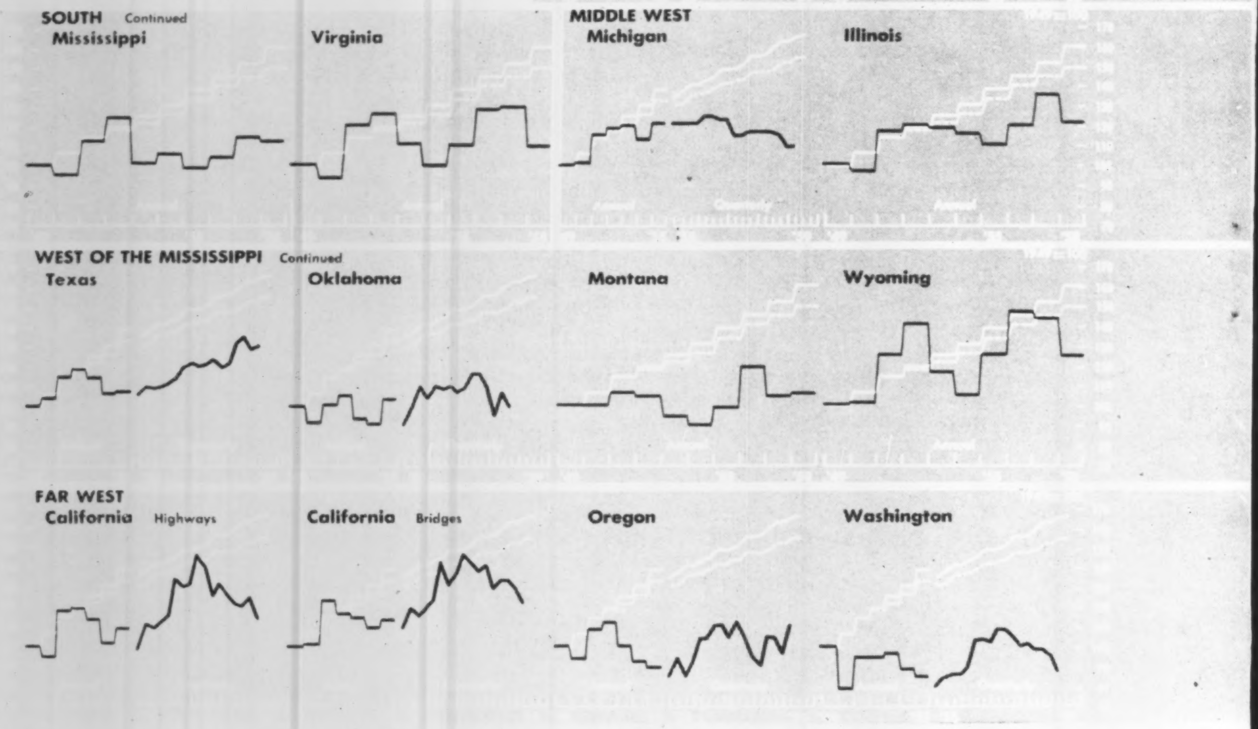
Highway Price Indexes

The Trend in

Contractor bid prices on state highway projects are below their peaks in 26 of 28 states, state highway department price indexes show.

But quarterly indexes for 11 states show most firmed up early this year.



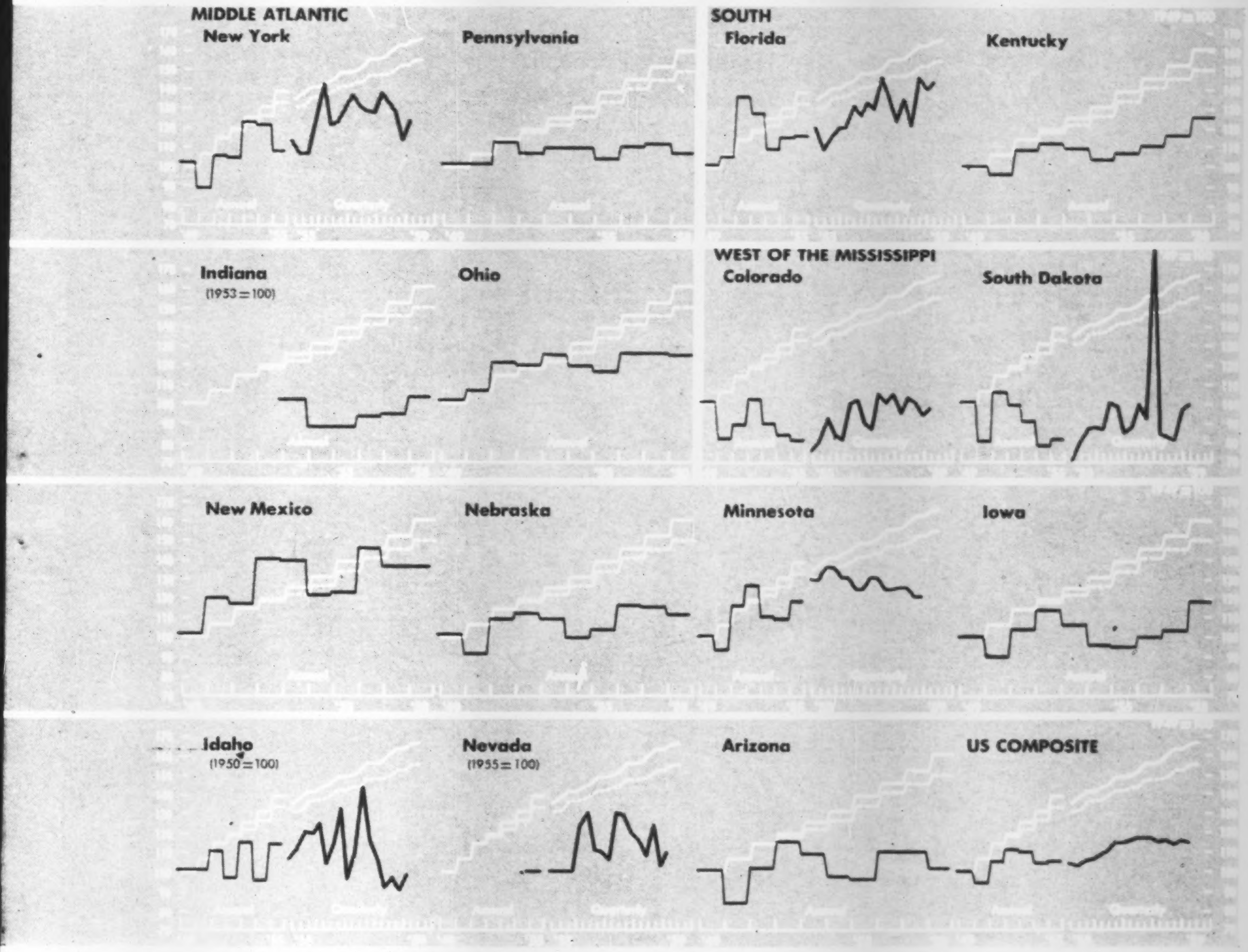


Highway Bid Price Indexes

Region:	NEW ENGLAND		MID-ATLANTIC		SOUTH				MIDDLE WEST				WEST OF MISS		
State:	Conn.	Maine	N. Y.	Pa.	Fla.	Ky.	Miss.	Va.	Mich.	Ill.	Ind.	Ohio	Colo.	S. D.	Texas
Base Yr:	1939	'37 '40	1940	1940	1950	'38 '41	'37 '41	'37 '41	1940	'37 '41	1953	'37 '41	1949	1940	'49 '53
1940	93.9		100.0	100	...	99.3	100.4	95.8	100.0	91		94		100.0	
1946	170.1	104	162.8	171		172.2	163.4	198.9	155.8	142		155		177.6	
1949	181.6	118	202.8	193	94.9	190.3	182.7	203.6	139.0	162		170	100.0	217.0	89.8
1950	177.9	153	175.1	192	100.0	184.3	175.5	190.8	151.5	158	...	180	82.2	176.3	97.3
1951	218.1	173	208.7	216	128.9	204.7	206.5	247.1	173.0	189		204	87.7	229.4	104.0
1952	226.7	195	207.5	205	120.5	213.9	227.4	258.4	177.0	195		203	101.5	212.6	105.6
1953	219.0	170	245.8	209	103.0	206.8	186.8	226.2	178.8	192	100.0	211	87.7	197.1	102.7
1954	222.9	179	240.6	208	109.3	196.0	195.0	203.8	158.0	187	86.5	201	82.8	168.6	96.3
1955	243.9a	171	214.8	199	109.7	202.7	180.7	223.4	181.9	179	86.9	197	81.4	177.0	97.0
1956	279.6	182	252.2	211	122.2	210.0	190.0	261.3	185.4	195	91.9	213	92.8	198.8	105.0
Q 1			257.1		114.3				186.8			..	80.5	189.6	100.6
Q 2	271.0		241.8		124.9							..	100.4	220.0	102.6
Q 3			235.2		120.0				183.9			..	101.9	212.0	107.4
Q 4	288.1a		250.9	...	126.3							..	88.5	184.8	109.2
1957	276.3	169	258.5	214	127.2	221.2	207.7	262.7	173.0	218	93.2	212	97.3	205.6	108.2
Q 1		...	273.1	...	122.9	.....	.....	.....	171.6	...	.....	..	86.4	189.0	107.1
Q 2	280.2b	...	261.7	...	138.8	.....	.....	.....		...	.....	..	105.4	213.7	108.3
Q 3		...	258.3	...	127.5	.....	.....	.....	174.3	...	.....	..	100.0	200.0	110.1
Q 4	263.1a	...	251.1	..	119.9	.....	.....	.....		...	.....	..	103.5	390.4c	106.9
1958	236.8	188	257.2	206	126.2	239.6	203.9	222.2	171.1	196	101.1	211	96.1	184.5	115.3
Q 1		..	277.1	...	114.5	.....	.....	.....	175.0	...	.....	..	93.7	179.6	109.2
Q 2	239.0b	..	266.8	...	116.9	.....	.....	.....		...	.....	..	102.5	177.1	118.7
Q 3		..	257.5	...	130.0	.....	.....	.....	172.7	...	.....	..	99.9	175.9	120.8
Q 4	233.6a	..	227.3	...	132.6	.....	.....	.....	162.7	...	.....	..	92.7	209.8	115.2
'59 Q 1	.....	...	246.7	...	135.1	.....	.....	.....	163.0	...	.....	..	97.2	216.9	117.0

For annual and quarterly indexes for previous years, see ENR June 19, 1958, p. 62 •a December •b June •c Index distorted by unusual projects

Contractors' Bid Prices in 28 States



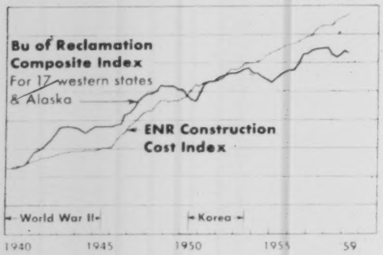
Reported by state highway departments and US Bureau of Public Roads

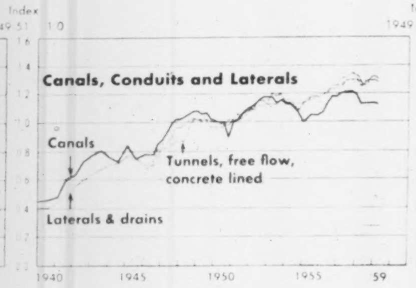
Region:	WEST OF THE MISSISSIPPI							FAR WEST							
								California							
State:	Okla.	Mont.	Wyo.	N. Mex.	Neb.	Minn.	Iowa	Hwy	Bridge	Ore.	Wash.	Idaho	Nev.	Ariz.	U. S. Composite
Base Yr:	1940	'40-'41	1940	'38-'41	'37-'41	1940	1949 b	1940	'39-'40	1940	1940	1950	1955	1940	1940
1940	100.0		100	101.2	93.2	100.0		100.0	99	100.0	100.0			100.0	100.0
1946		149.6	186	180.1	162.4	147.1		179.7	182	155.9	163.0			186.0	166.2
1949	180.7	180.7	167	179.2	207.1	160.0	100.0	190.7	204	181.1	214.5			198.8	203.6
1950	169.5	180.0	169	210.5	191.3 a	148.5	89.6	181.2	202	170.8	169.2	100.0		165.9	192.4
1951	182.0	192.4	209	206.1	223.7	185.3	104.1	225.0	248	194.7	202.8	110.2		201.1	214.7
1952	192.8	187.3	236	248.7	231.6	203.0	112.6	225.9	235	202.3	204.5	96.5		228.1	226.9
1953	168.6	169.0	196	246.9	223.8	175.8	106.1	215.2	229	182.0	208.3	113.2		214.1	223.7
1954	165.2	162.4	175	214.6	204.1	174.9	95.5	193.5	219	168.5	189.8	95.9		193.3	211.1
1955	185.7	176.3	210	217.1	212.2	188.8	95.4	205.7	228	162.3	181.9	113.5	100.0	190.9	213.4
1956	196.5	214.9	245	258.7	241.1	211.4	99.8	247.3	265	193.8	214.1	118.3	118.2	217.8	228.1
Q 1	198.0		...	.....		207.8	.....	219.5	245	186.6	190.0	124.0	123.1		220.0
Q 2	194.2		...	.....	.....		.....	255.9	284	188.5	221.4	104.4	130.2		225.0
Q 3	190.5		...	.....	.....	218.0	.....	249.1	260	198.6	223.7	113.0	111.2		233.5
Q 4	193.6	.....	...	.....	.....		.....	252.1	273	201.4	221.4	131.8	110.4		233.8
1957	201.7	188.5	238	241.5	237.7	208.7	102.6	264.3	283	187.8	226.4	116.1	124.3	218.4	237.5
Q 1	197.7	.....	...	.....	.....	209.3	.....	277.7	292	187.7	231.4	95.9	105.5		237.0
Q 2	209.1	.....	...	.....	.....		.....	266.9	283	202.0	232.2	109.0	130.4		237.2
Q 3	209.2		...	.....	.....	200.0	.....	237.5	275	188.0	225.1	143.4	128.7		237.3
Q 4	197.2							262.1	281	173.4	216.7	116.2	119.8		238.3
1958	189.4 a	192.1	209	241.7	229.8	197.4	118.0	236.5	267	180.1	211.4	96.4	113.3	203.4	233.9
Q 1	172.1	.....	...	.....	.....	201.2	.....	241.8	259	166.1	217.7	105.8	117.2	.....	233.4
Q 2	194.0	.....	...	.....	.....		.....	231.0	268	190.8	210.1	92.1	108.0	.....	235.3
Q 3	181.3	.....	...	.....	.....	194.9	.....	228.5	268	188.7	211.0	97.0	124.2	.....	231.4
Q 4	...	.....	...	.....	.....		.....	238.5	259	174.9	206.6	90.5	101.3	.....	235.3
'59 Q 1	.....	.....	...	.....	.....	.....	.....	216.1	245	201.4	189.0	97.6	110.0	.....	234.1

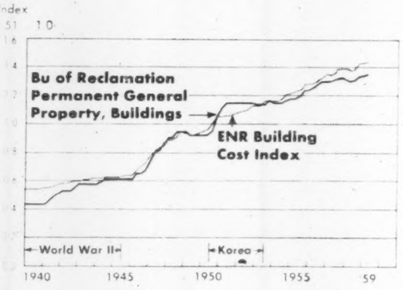
•a Aver of 9 months •b Computed by ENR from Iowa Average Unit Prices and quantities

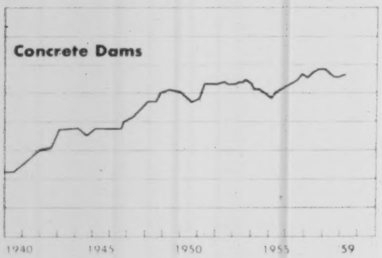
Irrigation-Hydro

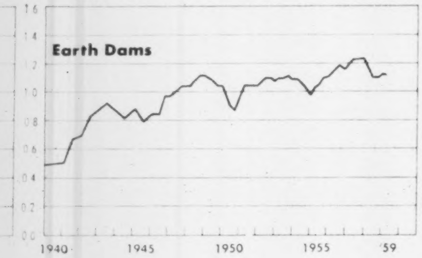
Stiffening competition among contractors is driving down costs of irrigation and hydropower construction despite a continuing rise in prices of basic materials and labor. The Composite Cost Index of the Denver Office, US Bureau of Reclamation, dipped 0.8% to 1.27 in April, based on 1949-51 = 100.

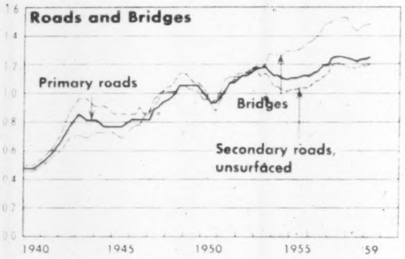


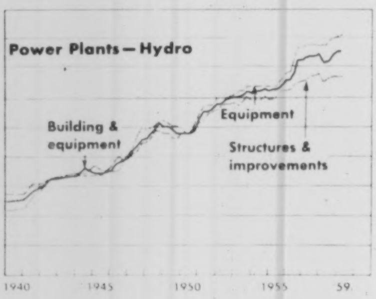


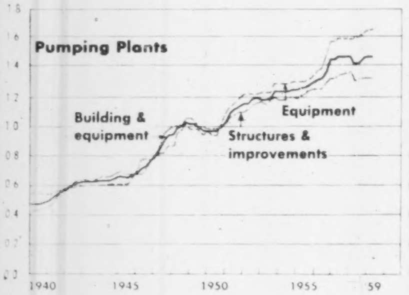


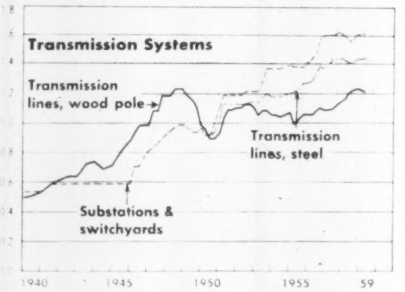












Irrigation & Hydro-power Construction Cost Indexes

US Bureau of Reclamation, Office of Assistant Commissioner and Chief Engineer, Denver, Colo.

Class of Construction	1940 Jan.	1941 Jan.	1942 Jan.	1943 Jan.	1944 Jan.	1945 Jan.	1946 Jan.	1947 Jan.	1948 Jan.	1949 Jan.	1950 Jan.	1951 Jan.	1952 Jan.	1953 Jan.	1954 Jan.	1955 Jan.	1956 Jan.	1957 Jan.	1957 Apr.
Composite Index	0.47	0.49	0.61	0.75	0.75	0.76	0.76	0.86	0.99	1.04	1.02	1.01	1.10	1.13	1.13	1.07	1.15	1.24	1.27
Dams, earth	0.50	0.52	0.70	0.88	0.87	0.89	0.85	0.98	1.05	1.12	1.05	0.98	1.05	1.09	1.09	0.98	1.07	1.15	1.19
Dams, concrete	0.47	0.52	0.62	0.76	0.76	0.76	0.76	0.83	0.95	1.00	1.02	1.02	1.07	1.07	1.04	0.97	1.04	1.11	1.14
Pumping plants, building & equip	0.48	0.50	0.58	0.63	0.64	0.67	0.69	0.80	0.95	1.02	0.97	1.04	1.10	1.18	1.24	1.25	1.31	1.43	1.45
structures, reinf conc, & improv	0.43	0.46	0.57	0.64	0.66	0.70	0.68	0.80	1.00	1.06	0.98	1.02	1.10	1.17	1.18	1.19	1.24	1.31	1.32
equipment	0.55	0.54	0.58	0.60	0.60	0.61	0.70	0.78	0.87	0.98	0.97	1.10	1.22	1.23	1.29	1.30	1.38	1.56	1.58
pumps & prime equipment				not available						0.94	0.97	1.08	1.22	1.28	1.34	1.35	1.44	1.61	1.66
accessory elec & misc equip										1.05	0.97	1.10	1.18	1.12	1.19	1.20	1.25	1.41	1.43
steel penstocks, discharge pipes								0.82	0.92	1.10	0.94	1.08	1.17	1.21	1.30	1.32	1.47	1.66	1.68
Canals	0.39	0.49	0.61	0.78	0.77	0.85	0.78	0.89	1.02	1.08	1.01	1.00	1.11	1.18	1.13	1.05	1.06	1.18	1.20
Conduits, tunnels, free flow, conc lined				not available			0.68	0.82	0.88	1.02	0.97	1.02	1.08	1.13	1.16	1.14	1.17	1.24	1.26
Laterals and drains	0.41	0.45	0.56	0.64	0.71	0.77	0.70	0.86	0.97	1.02	1.00	1.01	1.10	1.13	1.14	1.15	1.18	1.26	1.31
Primary roads	0.48	0.53	0.67	0.86	0.82	0.77	0.82	0.82	0.96	1.06	1.01	0.99	1.11	1.18	1.13	1.11	1.12	1.19	1.23
Secondary roads, unsurfaced	0.50	0.55	0.71	0.96	0.91	0.86	0.86	0.88	1.04	1.13	1.04	0.96	1.14	1.19	1.05	1.03	1.04	1.13	1.18
Bridges, steel	0.46	0.50	0.60	0.71	0.73	0.73	0.76	0.87	1.01	1.06	0.96	1.01	1.12	1.19	1.27	1.30	1.36	1.47	1.48
Power plants, hydro, building & equip	0.50	0.52	0.60	0.66	0.68	0.70	0.71	0.80	0.93	1.01	0.96	1.06	1.16	1.21	1.24	1.25	1.31	1.44	1.46
structures, reinf conc, & improv	0.43	0.46	0.58	0.67	0.69	0.74	0.70	0.82	0.99	1.05	0.99	1.03	1.12	1.17	1.19	1.19	1.24	1.30	1.31
equipment	0.55	0.55	0.62	0.66	0.68	0.67	0.73	0.79	0.96	0.96	0.96	1.09	1.20	1.23	1.28	1.28	1.36	1.53	1.55
turbines & generators	0.56	0.56	0.64	0.68	0.70	0.69	0.76	0.81	0.89	0.97	0.97	1.08	1.22	1.27	1.31	1.31	1.39	1.57	1.58
accessory electrical equipment	0.54	0.55	0.55	0.58	0.58	0.59	0.65	0.74	0.99	1.01	0.92	1.14	1.20	1.15	1.22	1.24	1.29	1.44	1.46
miscellaneous equipment	0.53	0.53	0.58	0.65	0.68	0.70	0.70	0.76	0.89	1.05	0.97	1.08	1.13	1.15	1.17	1.20	1.29	1.43	1.44
Concrete pipe lines				not available				0.88	0.92	0.96	0.99	1.09	1.11	1.11	1.10	1.10	1.15	1.27	1.27
Transmission switchyards & substations	0.53	0.54	0.59	0.59	0.59	0.59	0.59	0.81	0.92	0.99	0.97	1.11	1.19	1.22	1.37	1.39	1.41	1.50	1.50
Transmission lines, wood pole, 115kv	0.50	0.54	0.62	0.64	0.71	0.72	0.89	0.99	1.19	1.24	0.99	0.94	1.11	1.11	1.06	1.08	1.06	1.09	1.09
Transmission lines, steel tower, 230kv				not available								1.02	1.13	1.14	1.18	1.20	1.28	1.37	1.39
Permanent general property, buildings	0.43	0.44	0.53	0.58	0.58	0.62	0.62	0.75	0.91	0.95	0.95	1.11	1.15	1.14	1.15	1.18	1.25	1.30	1.30

Based on combined costs of material and labor furnished by the contractor and material and labor furnished by the government on Bureau of Reclamation projects in 17 western states and

Costs Dip

This dip reversed the rather sharp rebound during the preceding six months and pulled the Composite Index 2.3% ~~under its~~ October '57 record. Meanwhile, the gap widened between this index and the trend in basic materials and labor prices, as measured by the ENR Construction Cost Index. The ENR Index moved up 0.8% between January and April to 6.4% above October '57.

An unusual example of the kind of contractor price competition that explains this gap was the May 15 bidding on Wanapum Dam in Grant County, Wash. The low bid of $88.9 million was 35% under the engineering estimate of $137.6 million; highest of the five bids was 22% under (ENR May 21, p. 21).

This wasn't a Bureau of Reclamation job, but it demonstrates the rugged competition for the type of work the bureau handles in the region where it operates. The bureau's Earth Dam Cost Index in April was 4.3% under a year ago and 9% under the January '58 record.

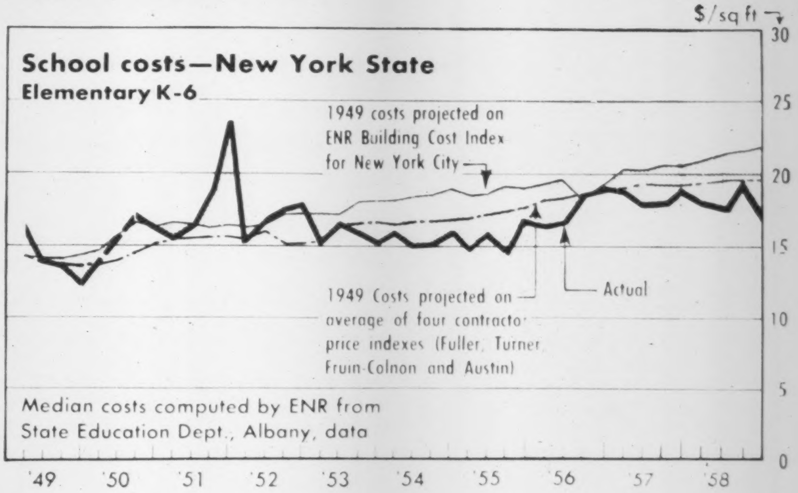
The latest decline in the bureau's Composite Cost Index was caused by decreasing costs for pumping plant structures −0.7%, canals −0.9%, concrete-lined conduits −0.8%, laterals and drains −1.5%, and wood pole transmission line −1.6%. They offset increases in the indexes for steel penstocks and discharge pipes +1.2%, roads +0.8%, concrete pipelines +1.5%, transmission switchyards and substations +0.6%, general buildings +0.7% and various types of pumping and power equipment.

—1949-51=1.0

	1957		1958				1959	
	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.
	1.29	**1.30**	**1.30**	**1.26**	**1.24**	**1.26**	**1.23**	**1.27**
	1.22	1.22	1.23	1.17	1.10	1.10	1.12	1.12
	1.15	1.16	1.16	1.14	1.12	1.12	1.13	1.13
	1.46	1.46	1.46	1.41	1.42	1.46	1.47	1.47
	1.34	1.35	1.36	1.30	1.32	1.33	1.33	1.33
	1.58	1.58	1.58	1.59	1.60	1.63	1.65	1.66
	1.66	1.66	1.66	1.67	1.68	1.71	1.73	1.75
	1.44	1.44	1.44	1.44	1.45	1.49	1.50	1.50
	1.72	1.72	1.72	1.66	1.63	1.69	1.72	1.74
	1.21	1.21	1.19	1.12	1.13	1.13	1.13	1.12
	1.29	1.30	1.30	1.25	1.28	1.29	1.29	1.28
	1.32	1.35	1.32	1.26	1.27	1.30	1.32	1.30
	1.25	1.25	1.24	1.22	1.21	1.23	1.24	1.25
	1.21	1.20	1.19	1.18	1.18	1.19	1.19	1.20
	1.52	1.52	1.52	1.46	1.44	1.47	1.48	1.48
	1.47	1.47	1.48	1.42	1.44	1.49	1.51	1.51
	1.33	1.34	1.36	1.30	1.33	1.34	1.34	1.34
	1.55	1.55	1.54	1.55	1.58	1.60	1.61	1.62
	1.58	1.58	1.58	1.59	1.60	1.62	1.64	1.66
	1.48	1.48	1.48	1.48	1.49	1.52	1.52	1.52
	1.44	1.44	1.40	1.40	1.40	1.44	1.44	1.45
	1.28	1.28	1.29	1.28	1.32	1.32	1.33	1.35
	1.60	1.61	1.60	1.58	1.56	1.60	1.61	1.62
	1.10	1.13	1.16	1.18	1.21	1.23	1.23	1.21
	1.33	1.43	1.43	1.42	1.40	1.43	1.44	1.44
	1.31	1.31	1.30	1.30	1.32	1.34	1.35	1.36

Alaska

School Costs



New York School Costs Drop

Contract prices of new elementary schools in New York State dropped late in 1958. The median cost of 10 schools awarded in the last quarter was $17.08 per sf.

The fourth quarter median cost was down $2.67 per sf or 13.5% from the third quarter median for K-6 elementary schools. Moreover, it was the lowest cost since the second quarter of 1956 (see chart above).

The fourth quarter '58 decline was most pronounced for schools with two large units, such as auditorium and gymnasium. The median contract cost for this type dropped to $16.38 per sf, down 17.5% from the third quarter peak. The cost extremes were down, the minimum dropping to $13.50 per sf and the maximum to $18.50 (see table).

For elementary schools with one large unit, the fourth quarter minimum and maximum were also lower than in the third quarter. But the median rose to $20.13 per sf, up 2.4% from the third quarter (though still 3.2% under the high set in the final quarter of 1957).

Costs of two secondary 7-12 schools averaged lower in the fourth quarter of '58. The cheaper was slightly under the minimum in the second quarter, while the other was only a little higher than the second quarter minimum cost.

Data is available for only one school let in '59. Its cost of $18.50 per sf matches the maximum during the last quarter of '58.

School Costs Per Square Foot in New York State

State Education Department, Division of School Buildings and Grounds

	No. of Schools K-6 Total	Elementary, K-6 Dollars per sq ft for schools with One Large Unit*			Two Large units*			Three Large Units*			No. of Schools 7-12 Total	Secondary, 7-12 Dollars per sq ft		
		Min	Med	Max	Min	Med	Max	Min	Med	Max		Min	Med	Max
1949	29	$10.40	$14.00	$19.20	$12.00	$14.60	$18.70				4	$13.20	$13.55	$16.20
1955	52	11.75	16.40	23.60	11.90	15.70	20.25	$14.90	$14.90	$15.90	13	12.55	17.10	18.50
1956	53	12.90	17.85	23.80	13.25	17.65	21.10	16.50	16.80	17.10	7	15.40	18.15	20.90
1957	50	14.65	19.28	25.20	12.90	18.10	21.75		18.70		10	16.40	18.61	20.60
1958	32	13.85	18.95	22.30	13.50	17.30	20.30				8	15.90	16.55	19.70
'56, Q1	11	14.95	15.10	18.40	14.45	16.80	18.50				2	16.75	18.33	20.90
Q2	18	14.40	16.50	18.55	14.60	18.00	19.00		17.10		2	15.80	16.98	18.15
Q3	9	12.90	19.10	21.60	14.15	18.50	21.10		16.50		2	15.40	17.25	19.10
Q4	15	16.00	20.70	23.80	13.25	18.85	21.00				1		18.60	
'57, Q1	11	17.80	18.58	19.35	15.70	19.23	21.75		18.70		1		18.51	
Q2	14	14.65	19.60	25.20	12.90	18.10	19.00				5	18.70	19.35	20.00
Q3	11	18.60	19.15	19.40	14.40	17.78	18.40				3	16.30	19.50	20.60
Q4	14	16.95	20.80	25.20	17.60	19.00	19.60				1		18.90	
'58, Q1	7	18.20	18.30	18.45	16.60	17.48	19.45				2	16.60	17.30	18.00
Q2	9	16.65	18.55	20.30	16.30	17.80	19.35				4	16.00	17.13	19.70
Q2	6	16.95	19.65	22.30	16.65	19.85	20.30							
Q4	10	13.85	20.13	21.00	13.50	16.38	18.50				2	15.90	16.20	16.50
'59, Q1	1					18.50								

* Large Unit includes a general purpose room, gymnasium, auditorium, multi-purpose or other group activity room.
These are costs based on the four contracts general construction, plumbing, electrical, heating and ventilating. They include built-in features, but no movable furniture or equipment. Some minor site improvement may be included, but no major site work and no land costs.

Contractors' Prices Level Off

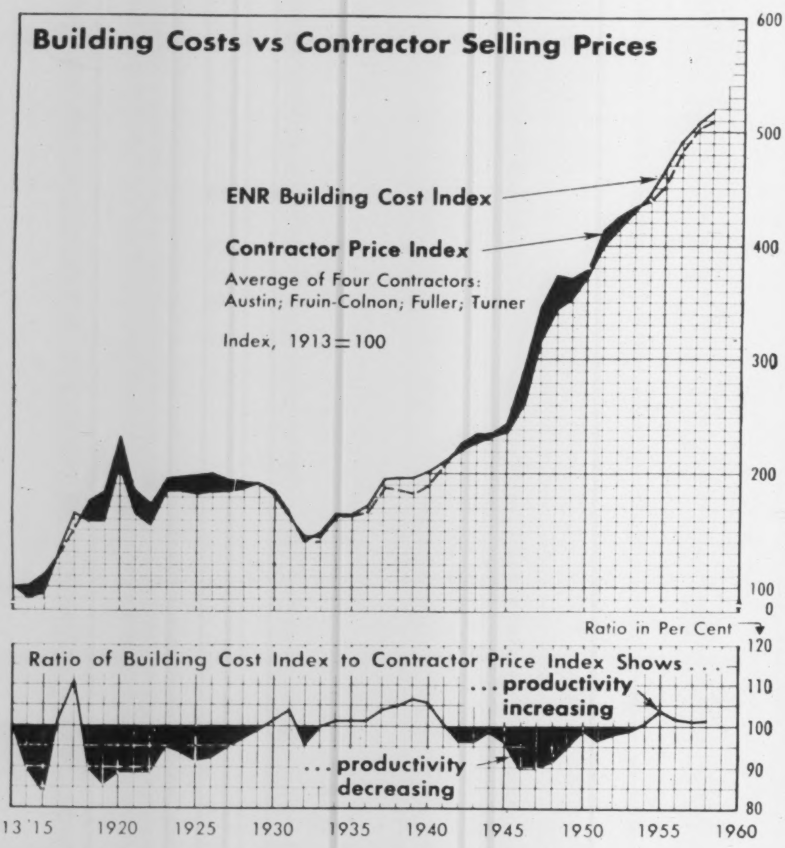
The renewed uptrend in contractors' selling prices late in '58 and early '59 petered out in the spring. But this is only a pause in the nine-year rise which has lifted selling prices by 39%.

The full impact of wage increases for building trades will come by July 1.

Additional pressure for higher selling prices will come from steel price increases, which are expected to follow settlement of labor negotiations. Structural steel fabricators would probably pass on to contractors the higher costs of steel and wages paid crews belonging to the Steelworkers Union.

Some respite from the '59 cost push is provided by stable cement prices and the prospect of more stable or lower lumber prices. Plywood prices cracked two weeks ago, though most of the recent increase remains in the quotations.

Contractors to absorb as much of the cost push as possible by increasing productivity are paying dividends to buyers.



ENR Indexes for 22 Cities

Construction Cost Index, 1913 = 100

City	June '49	June '56	June '57	1958 Mar	1958 Jun	1958 Sep	1958 Dec	1959 Mar	1959 Jun
Atlanta	345	502	523	558	558	584	584	594	594
Baltimore	425	595	643	672	701	708	709	711	711
Birmingham	389	549	556	593	593	599	619	622	624
Boston	526	744	746	764	793	809	807	810	832
Chicago	526	788	831	835	838	857	859	866	875
Cincinnati	487	680	713	745	746	780	777	785	790
Cleveland	514	809	856	847	849	874	880	893	919
Dallas	398	509	525	547	553	573	573	573	573
Denver	482	670	702	725	725	731	731	731	742
Detroit	489	800	823	852	852	889	892	897	962
Kansas City	501	709	735	742	762	768	768	773	794
Los Angeles	478	733	731	773	814	822	824	828	839
Minneapolis	504	747	781	803	818	825	824	839	855
New Orleans	379	564	572	588	591	602	617	617	620
New York	534	819	852	910	912	953	940	968	978
Philadelphia	492	737	780	775	795	803	790	791	804
Pittsburgh	492	688	762	804	819	827	827	827	840
St. Louis	508	756	789	814	840	849	844	854	891
San Francisco	478	726	758	758	798	820	812	817	824
Seattle	530	720	749	785	789	799	799	836	836
Montreal	408	560	586	584	603	603	604	603	610
Toronto		562	611	607	605	622	638	642	674
U. S. Average	**474**	**692**	**721**	**744**	**757**	**773**	**774**	**781**	**790**

Building Cost Index, 1913 = 100

City	June '49	June '56	June '57	1958 Mar	1958 Jun	1958 Sep	1958 Dec	1959 Mar	1959 Jun
Atlanta	308	424	442	456	461	472	472	477	477
Baltimore	349	491	503	523	527	534	542	543	543
Birmingham	329	447	457	477	480	488	493	495	498
Boston	362	503	518	522	528	547	542	551	560
Chicago	349	500	511	527	535	560	562	569	578
Cincinnati	356	475	489	501	502	519	515	525	529
Cleveland	332	508	522	512	515	527	533	539	554
Dallas	322	424	439	451	459	469	469	472	474
Denver	351	488	510	523	525	530	532	532	537
Detroit	336	514	535	545	545	573	574	579	599
Kansas City	357	497	503	517	527	533	533	538	548
Los Angeles	339	491	496	507	514	527	530	536	552
Minneapolis	361	515	530	537	547	554	553	554	564
New Orleans	325	457	467	478	477	485	494	494	499
New York	398	556	578	593	601	622	609	629	639
Philadelphia	394	538	560	561	569	581	569	570	583
Pittsburgh	375	500	541	569	573	593	595	595	595
St. Louis	375	522	538	552	558	567	563	576	590
San Francisco	341	476	486	503	507	533	533	538	550
Seattle	328	444	456	466	470	484	484	493	499
Montreal	316	437	451	446	449	449	449	449	450
Toronto	...	450	469	470	468	469	479	482	500
U. S. Average	**349**	**489**	**504**	**516**	**521**	**535**	**535**	**540**	**548**

Building Cost & Price Indexes, 1913 = 100

	Weighted Cost Indexes								Contractor Price Indexes				
	GENERAL CONSTRUCTION		INDUSTRIAL		COMM'L AND FACTORY	PUBLIC UTILITY, PACIFIC	GENERAL BLDG.		INDUSTRIAL			GENERAL	
Yr & Month	ENR Constr.	Assoc. Gen. Contr.	American Appraisal Company	Marshall & Stevens	E. H. Boeckh cd	Handy-Whitman g	ENR Bldg.	Smith Hinchman & Grylls ae	Aberthaw b	Austin e	Fruin-Colnon	Fuller	Turner f
1926	208	197	217	185	181	191	185	185	197	185	218	202	195
1932	157	171	155	130	144	145	141	128	168	117	178	157	136
1939	236	188	200	183	191	192	197	199	190	152	208	195	182
1949	477	342	490	365	369	416	352	395	312	307	382	382	413
1955	660	439	608	479	465	524	469	522	398	366	483	462	498
1956	692	462	635	503	489	588	491	544	427	400	503	482	544
1957	724	483	663	515	507	634	509	568	453	420	512	504	576
1958	759	499	682	528	517	650	525	565	453	427	530	526	576
1959													
Jan	778	505	693	...	527	660	536	566	...	...	540	540	584
Feb	779	506	693	...	527	...	537	568	...		541		
Mar	781	507	694	538	527	...	540	570	...	427	542		
Apr	784	509	696	...	531	...	543	570			542	540	584
May	790	511	703	...	534	...	544	572			556		
Jun	795		...	...		...	548		466p				

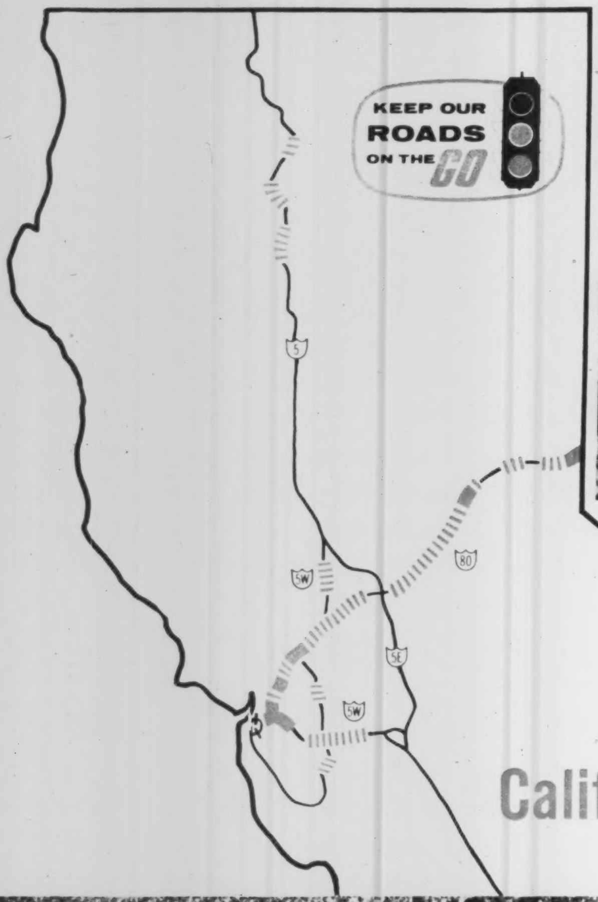
a Includes adjustment for estimated changes in productivity •b 1914 = 100 •c Incl contractor overhead, profit and adjustment for estimated changes in productivity •d Reported on 1926 29 base •e Reported on 1926 base •f Reported on 1939 base •g Reinf conc bldg, 1911 14 = 100 •p Preliminary for explanation of these indexes see ENR Mar. 19, 1959, p. 89

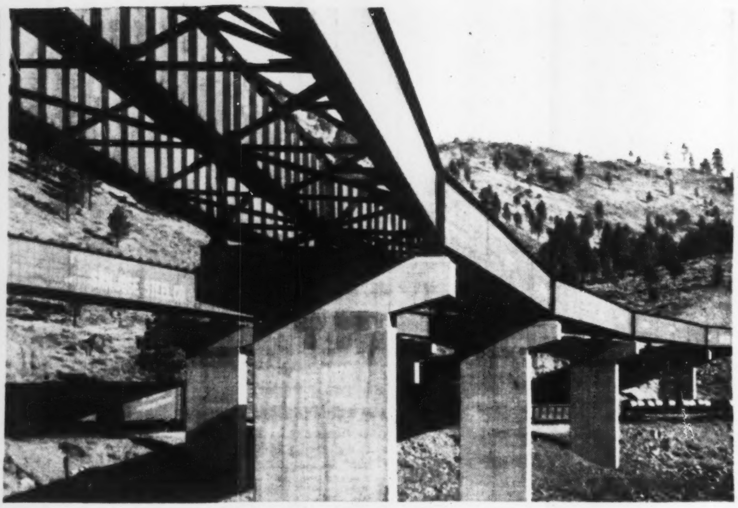
Monthly Index History

Historical record of ENR Cost Indexes, graphs and tables for all years 1913-56 is in the supplement to Engineering News-Record, Oct. 17, 1957 by Business News Department, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y. Reprints are available at $1 each. Selected years through 1958 are in supplement to ENR March 19, 1959. Reprints available at 50 cents each. Lower rates on 10 or more.

CIRCLE J-2 READER SERVICE CARD ›

2,194 miles of Interstate Roads underway in CALIFORNIA
SAN JOSE STEEL
SAN JOSE STEEL
KEEP OUR ROADS ON THE GO
USS United States Steel





Steel Bridges over the Truckee—Structural Steel bridges carry Interstate Route 80—(U.S. 40) over the Truckee River in the Tahoe area. Over 17,000 tons of structural steel a year help make California's highways among the best in the nation.

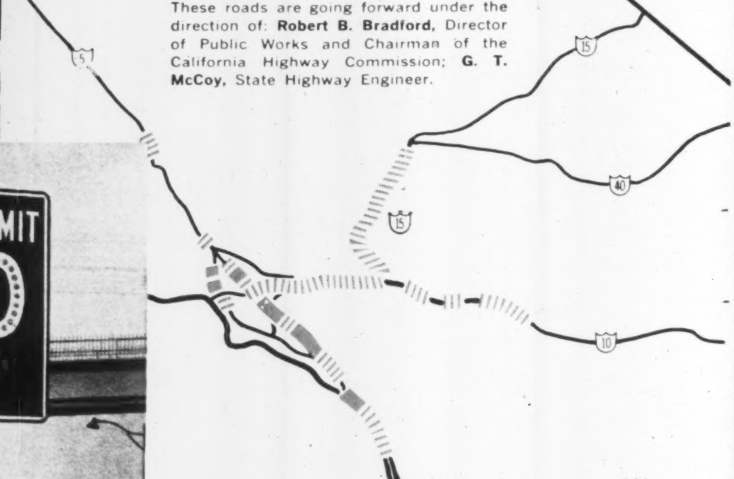
California speeds construction

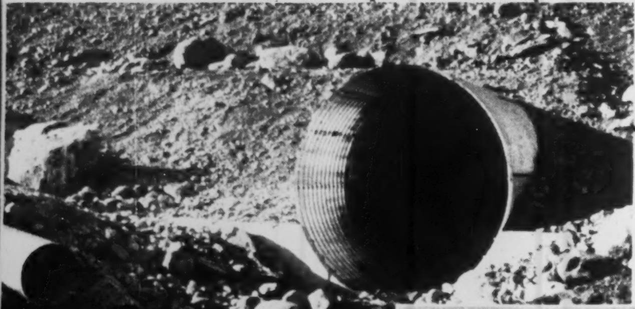
▬ Completed

|||||||||| Partially completed or under construction.

— Present highway to be made into Interstate.

These roads are going forward under the direction of: **Robert B. Bradford,** Director of Public Works and Chairman of the California Highway Commission; **G. T. McCoy,** State Highway Engineer.



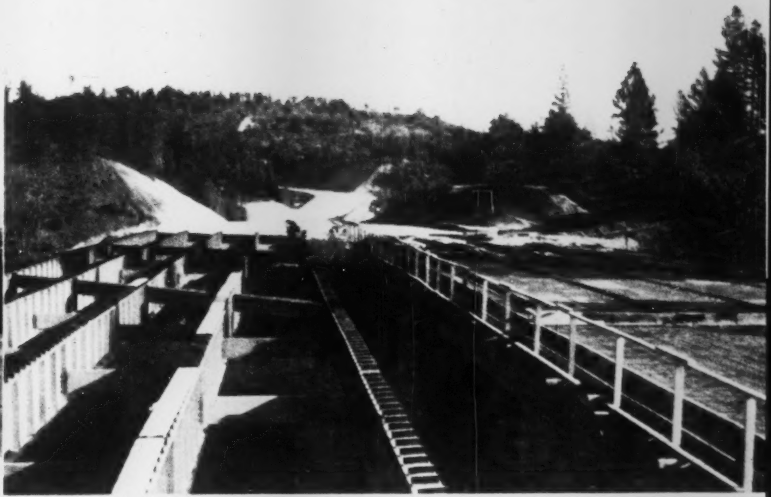


Drainage for Interstate 80—(U.S. 40) USS Galvanized Culvert Sheets and sectional plate structures solve drainage problems under the Interstate Highway at Truckee, California. Here steel provided low-cost, rapid construction.

SPEED LIMIT
50
MILES

Steel signs, posts, and guardrail—Available from U. S. Steel are most of the basic products that produce long-lasting, low-maintenance signs and markers; uniformly coated galvanized steel sheets, steel plates and tubular sections for hot-dip galvanized posts, poles, and supports; USS *Vitrenamel* Sheets for porcelain enameled signs. Also shown here is USS *Western* Guardrail on the San Bernardino Freeway, Los Angeles.

Overpass at Albany—Steel girders will be placed on top of these steel-reinforced concrete columns to form an overpass at Albany, California. USS *Di-Lok* Concrete Reinforcing Bars are used for all types of concrete work; and Universal Atlas Cement Division of United States Steel, offers a wide variety of portland cements. *Tiger Brand* Wire Rope is used in cranes; pavers, shovels, ditchers, trenchers, derricks, mixers and road scrapers.



Steel Bridges at Magra—The USS *Di-Lok* Bars in the right hand side of these bridges at Magra near Gold Run, California, are ready for concrete. The next step in the construction of the left hand bridge is to place the decking on top of the continuous girder span.

# of 2,194 miles of Interstate Highways

with products from United States Steel

CALIFORNIA'S HIGHWAY COMMISSION has planned 2,194 miles of Interstate Highways to be completed by 1975. 1,453 miles have already been located; 73 miles have been completed, and 170 miles are under construction. Several hundred miles of California's own Freeways are near to meeting the rigid requirements for the Interstate System; when they do, the number of *completed* miles will rise rapidly.

Steel is high on the list of products being used to speed construction on the eighteen highways in California's Interstate System: 3,186 bridges, overpasses, underpasses, and traffic-controlling clover-leafs will be built; 123 bridges are already completed and 194 are now under construction.

United States Steel supplies a complete line of products for highway construction: Structural carbon steel and special high-strength and constructional alloy steels for bridges; steel H-piles, sheet piling and tubular piles for bridge foundations; drainage products; reinforcing bars, welded wire fabric, cements, slag and other pavement construction products; wire rope, cable, tubing and special steels, and steel products for construction equipment; and a complete range of items including fence, beam and cable guardrail, steel for signs, markers, and other accessories. Write for the *free* 54-page booklet, "Keep Our Roads on the Go." This booklet lists all the products and services available from United States Steel to help you cut costs and speed operations in every phase of highway construction. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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USS United States Steel

The highway market is served by the following divisions of United States Steel: American Bridge Division, Pittsburgh, Pa. • American Steel & Wire Division and Cyclone Fence Department, Cleveland, Ohio • Columbia-Geneva Steel Division, San Francisco, Calif. • Consolidated Western Steel Division, Los Angeles, Calif. National Tube Division, Pittsburgh, Pa. • Tennessee Coal & Iron Division, Fairfield, Alabama • Universal Atlas Cement Division, New York • United States Steel Supply Division, Steel Service Centers, Chicago, Illinois.

Contractor's Dollar Still Shrinking

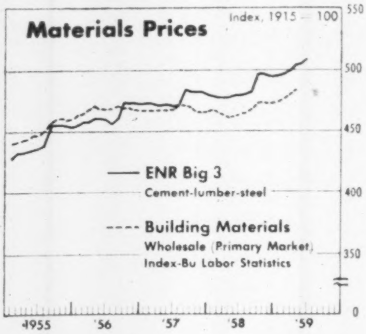
Inflation is shrinking the purchasing power of contractors' dollars. It's eating away the amount of steel, lumber, cement, equipment and labor he can buy with each dollar. He's also paying a higher price for working capital and equipment loans. Except for his part at the bargaining table with labor, the contractor has no control of the forces creating the cost push. But he can't ignore them. He must be alert for current and likely future price changes.

Materials The probes into inflation going on in Washington will focus public opinion on manufacturers' and labor's actions that affect prices. But this can only slow inflation, not stop it.

Steel prices, for example, will probably advance this summer at the conclusion of wage negotiations in the industry. ENR expects that the mill price of structurals will rise $4 per ton.

However, prices of other major construction materials may not change much during the rest of '59. The rise in lumber prices (up 7% this year) may have run its course. The unusually heavy demand appears to be slackening as rising interest rates caution homebuilders. Plywood prices cracked two weeks ago, though they are still close to the recent high.

Mill prices of cement won't change before 1960. Next year's pattern will depend on local conditions, but keen competition and the large gap between capacity and demand could serve to hold any price increases to minor amounts. This year, prices rose only at certain mills in the Northeast and Far West. Next year may see scattered increases in the South and Midwest.

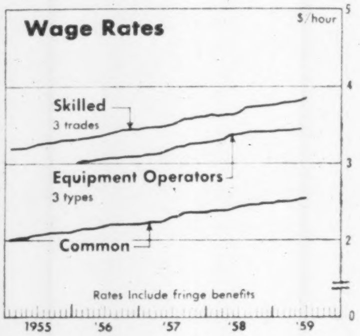


Manpower Construction wage increases ranging from 5 to 25 cents per hour and averaging about 14 cents are the biggest force behind the 1959 cost push.

Contractors are having some success in holding down wage raises this year to one or two cents less per hour, on the average, than in recent years (ENR June 11, p. 21). Moreover, the size of deferred wage hikes provided by existing long-term contracts is also toward slightly smaller annual increases.

Contractors and construction labor unions are jointly making some headway in cutting wage costs by removing certain restrictive labor practices. Progress this year is mainly in permitting greater use of power tools and other equipment (which will increase worker productivity and cut costs) and some downward adjustment in travel allowances.

However, wide adoption of the "Ten Commandments" work practices code drawn up last spring is still a long way off, judging from the slow response by construction unions.

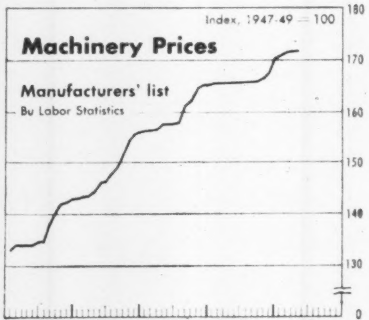


Machinery Construction equipment prices are afflicted with a case of "creeping inflation" this year. Price increases are coming along only a few at a time, but enough to cause a slow, steady rise in average list prices.

The U.S. Bureau of Labor Statistics Index of Manufacturers' Prices moved up 0.6% during the January-April period to a new record high. The April 15 value (latest available) was about 4% higher than in April 1958.

The slow rise early this year contrasts with the greater stability during early 1958. But it follows the pattern that was set early in 1955, '56 and '57 when contractors were investing heavily in new equipment as they are this year.

Higher steel prices, increased labor costs and a strong market through the rest of 1959 point to another major round of construction equipment price increases toward the end of '59.

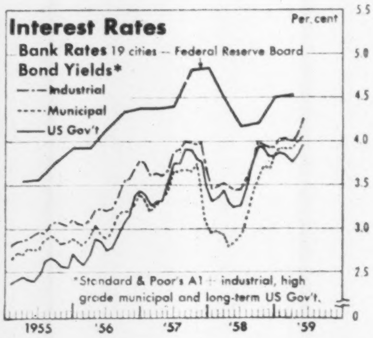


Money Within the past month contractors and construction materials and equipment suppliers have been confronted with higher interest charges on new loans. The increases have come on top of previous advances this year and late '58 especially in the southern and western sections of the county.

Long-term borrowing costs have also moved up in the last few weeks. This makes it more expensive to finance public works, industrial and commercial building and housing.

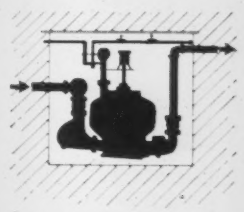
Expanding business activity promises to keep the pressure on interest rates charged for bank loans and bond issues. Some further increase in borrowing costs is likely during the balance of '59 as the gap between rising demand and available investment capital widens.

Though interest rates are likely to fluctuate downward as well as upward this year, the trend will probably continue up. An increase in the interest ceiling on US Treasury bonds could "freeze in" the increases to date in borrowing costs. The general rise in interest rates will hurt homebuilders.



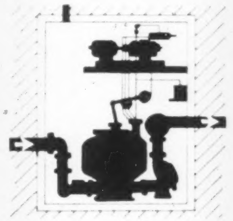
Which sewage lift station is best for your job?

TOPS IN DEPENDABILITY AND SAFETY



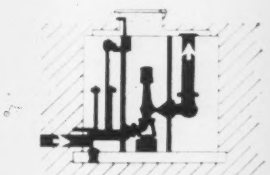
Concrete or steel underground station with Shone® Type S pneumatic ejector, mechanically controlled (warranted 25 years). Remote air supply. Nothing electrical; maintenance free; operates even under water. Life measured in decades. For municipalities and large subdivisions.

SURPRISINGLY VERSATILE, INEXPENSIVE



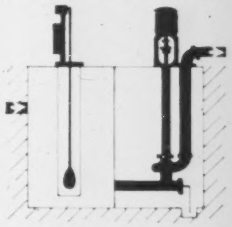
Shone® Type SAC station, underground in concrete vault. Mechanically controlled ejector (warranted 25 years) has its own compressor. Frequently less costly than package stations. Finds use everywhere.

PACKAGE STATION



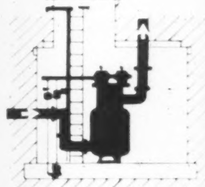
Quality underground station with vertical, short-coupled (Series 6260), dry pit centrifugal pumps. Quality design and equipment give good service life at nominal cost. For small permanent stations, growing areas.

LOW FIRST COST—EASY INSTALLATION



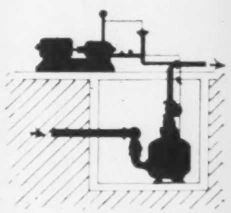
Two-compartment steel basin with centrifugal vertical wet pit pump. Pumps are not submerged; motors protected from flooding. Low first cost; fast installation. For buildings, small growing subdivisions.

ULTIMATE IN PACKAGE DESIGN



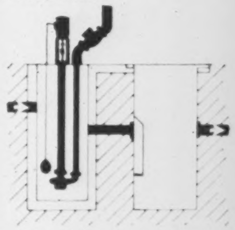
Package underground station with Expelsor® pneumatic ejector, electrode controlled. Sanitary and dependable, low maintenance, easy to service. Recommended for municipal and subdivision applications.

BUILDING TYPE STATION



Expelsor® pneumatic ejector station designed for use in buildings. Compressor is on basement floor; ejector on floor below. Sealed installation gives safe, odorless handling of sewage indoors.

SPECIAL PROBLEMS?



Centrifugal vertical wet pit pumps with adjoining settling basin. Good for areas where sand or old sewers create problems. Special pump construction for abrasive or corrosive conditions, industrial wastes.

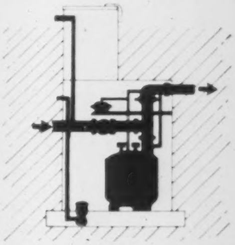
The answer depends on the job. Is it to be a temporary station? What about future loads? How much maintenance will it get? What type of power is available? These and many other questions must be weighed carefully and without bias. In making the decision, why not put Yeomans 61 years' experience (59 on underground stations alone) to work? Because Yeomans builds **the only complete line** of sewage lift stations in the industry, recommendations are **impartial** and in your best interest. Phone, wire, or write now.

YEOMANS

1999-1 N. Ruby St., Melrose Park, Ill.

SPECIALISTS IN SEWAGE LIFT STATIONS—THE COMPLETE LINE

MAXIMUM RELIABILITY—MINIMUM SPACE



Package underground station. Expelsor® pneumatic ejector has two compartments, duplex compressors and controls. Excellent service accessibility. Especially suited for subdivision and municipal lift stations.

L-5911

Materials Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- ● Clay Products, Lime, Plaster, Paint, Roofing: Last, May 28: Next, June 25.
- ● Wage Rates, Building Board, Lath, Insulation: Last, May 28: Next, July 2.
- ● Cement Aggregates, Ready mixed Concrete, Asphalt: Last, June 4: Next, July 9.
- ● Iron & Steel Products, Pipe: Last, June 11: Next, July 16.

LUMBER, TIMBER, PLYWOOD PER M FT.B.M., CARLOAD LOTS F.O.B.

SOUTHERN PINE AND DOUGLAS FIR

All Southern Pine is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face)

All Fir boards, dimensions, planks No. 2. Fir small timbers and timbers are No. 1. Lengths up to 20 ft. (Prices in italics)

LONG LEAF Y. P. Merchantable grade up to 20 ft. — FIR PLYWOOD

		1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 R/S	6x12 R/S	12x12 R/S	Long Leaf Y. P. 2x12 R/S	Long Leaf Y. P. 12x12 R/S	Fir Plywood ⁵⁄₈" Interior plyscored, C-D gr.	Fir Plywood ¾" Plyform grade
Atlanta	n†	**$73 00**	**$76 00**	**$76 00**	**$79 00**	**$81 00**	**$86 00**	**$136 00**			**$121 00**	**$156 00**	$135 00	$216 00
Baltimore	o	**95 00**	**100 00**	**102 00**	**102 00**	**102 00**	**107 00**	**119 00**			**175 00**	**190 00**	175 00	260 00
		113 00g	*118 00g*	*128 00g*	*128 00g*	*128 00g*	*128 00g*	*148 00g*	*$165 00*	*$155 00*				
Birmingham	n†r	**83 00**	**85 00**	**84 00**	**84 00**	**89 00**	**95 00**	**111 00**			**120 00**	**168 00**	163 30	256 94
		80 00	*80 00*	*79 00*	*81 00*	*81 00*	*98 00*	*83 00*	*80 00*	*80 00*				
Boston	ns	**102 00f**	**102 00f**	**111 00f**	**111 00f**	**111 00f**	**118 00a**						185 00	320 00R
		106 00	*106 00*	*123 00*	*123 00*	*123 00*	*128 00*	*137 00*	*139 00*	*160 00*				
Chicago	**	**124 00**	**127 00**	**121 00**	**135 00**	**143 00**	**144 00**	**139 00**			**167 00**	**167 00**	168 00	276 00
		130 00	*130 00*	*143 00*	*141 00*	*141 00*	*142 00*	*150 00*	*150 00*	*150 00*				
Cincinnati	n*	**102 50**	**103 75**	**96 50**	**98 00**	**104 75**	**112 75**	**121 00**			**138 00**	**135 00**	108 00f	220 00f
		110 75	*113 75*	*116 00*	*117 00*	*118 00*	*133 75*	*143 25*	*143 25*	*143 25*				
Cleveland	o**	**93 00**	**93 00**	**97 00**	**95 00**	**98 00**	**100 00**						139 00a	251 00a
				117 00	*113 00*	*117 00*	*120 00*	*130 00*	*132 00*	*132 00*				
Dallas	‡R	**76 00k**	**85 00k**	**80 00k**	**80 00k**	**78 00k**	**78 00k**	**125 00**			**133 00**	**160 00**	112 50ac	196 00ac
Denver	n*	*Not in stock*		*118 50*	*119 50*	*119 50*	*120 50*	*136 00*	*148 50*	*175 00*			154 00	281 50
Detroit	‡	**138 00**	**140 50**	**138 00**	**136 00**	**143 50**	**143 50**				**151 50**		180 00gc	310 00gc
		142 25	*142 25*	*153 25*	*151 50*	*160 00*	*165 50*	*204 00*	*221 00*	*221 00*				
Kansas City	tn	**125 00**	**125 00**	**135 00**	**137 50**	**140 00**	**150 00**						162 75	265 00
		125 00	*125 00*	*135 00*	*137 50*	*140 00*	*145 00*	*175 00*	*225 00*	*225 00*				
Los Angeles	xnu	*108 00*	*108 00*	*108 00*	*108 00*	*108 00*	*108 00*	*136 00*	*141 00*	*141 00*			140 00	260 00
Minneapolis	or	*145 00m*	*145 00m*	*145 00*	*145 00*	*145 00*	*145 00*	*185 00*	*185 00*	*185 00*			200 00	320 00
Montreal	*bpw	**84 00a**	**90 00a**	**84 00a**	**84 00a**	**99 00a**	**125 00a**				**120 00**	**120 00**	119 25	225 95
		160 00	*160 00*	*160 00*	*160 00*	*160 00*	*160 00*	*170 00*	*170 00*	*170 00*				
New Orleans	tn	**89 00**	**89 00**	**95 00**	**92 00**	**92 00**	**97 00**	**126 00**			**160 00**	**153 00**	122 41	215 00
		128 00	*128 00*	*117 50*	*138 00*	*138 00*	*138 00*	*140 00*	*140 50*	*160 50*				
New York	t	**119 00**	**120 00**	**129 00**	**129 00**	**129 00**	**135 00**	**245 00**			**245 00**	**255 00**	131 20a	250 60a
				132 00	*132 00*	*132 00*	*135 00*	*172 00*	*172 00*	*172 00*				
Philadelphia	‡n	**Range from 112 132**					**117 137**	**117 137**			**226 236**	**226 236**	145 00b	260 00b
		Range from 122 152					*127 157*	*137 167*	*170 00*	*170 00*				
Pittsburgh	nt	**115 00**	**120 00**	**130 00**	**120 00**	**145 00**	**145 00**	**165 00**			**160 00**	**185 00**	225 00	295 00
		120 00	*120 00*	*140 00m*	*150 00*	*175 00*	*200 00*	*220 00*	*200 00*	*200 00*				
St. Louis	lnx	**127 00**	**129 00**	**137 00d**	**137 00d**	**137 00e**	**142 00e**						185 02ach	290 02ach
				150 00	*150 00e*	*150 00e*	*152 00e*	*204 00e*	*204 00e*	*204 00*				
San Francisco	nz	*95 00*	*95 00*	*100 00*	*100 00*	*100 00*	*100 00*	*112 00*	*133 00*	*133 00*			108 00b	205 00b
Seattle	n†	*68 00*	*72 00*	*82 00*	*82 00*	*82 00*	*84 00*	*95 00*	*100 00*	*100 00*			125 00aeg	250 00aeg
Toronto		**104 00a**	**109 00a**	**100 00a**	**98 00a**	**103 00**	**102 00a**	**110 00a**			**101 00a**		245 00	319 00
		135 00	*115 00*	*130 00*	*124 00*	*128 00*	*128 00*	*138 00*	*135 00*	*135 00*				

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL.

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. •a Spruce. •b Federal tax exempt, add 6% mun. & prov. tax. •c 5M lots. •d 8, 10, & 12 ft. lengths. •e 8 to 16 ft. lengths. •f Hemlock. •g No. 1 common. •j 8 ft. lengths. •k No. 3 common. •l Add 2% sales tax. •m Up to 16'; No. 3 western pine. •n Less 2% disc. 10 days. •o Less 2% disc. 10th. •p Less 1% disc. 10 days. •q fir: $80.25 in truck lots, fob job or CL, f.o.b. city. •r for f.o.b. city price add $8 for pine, $35 for fir. •s asd trucklots 5 6 Mfbm. •t trucklots del. •u Retail LCL yard. •v Retail LCL, del. •w add 6% mun. & Prov. tax. •x add 4% sales tax.

* PLYWOOD (Plyform, oiled and edge sealed): Douglas fir, 4' x 8' panels, 5-ply sanded 2 sides, carload lots, delivered per 1000 sq. ft. surface. Seattle base price, Interior, moisture resistance, ⁵⁄₈", $186.00; ¾", $211.00 Exterior, waterproof, ⁵⁄₈", $190.00; ¾", $215.00. •a Delivered. •b Price may increase this month. •c Truck lots. •d A-C exterior. •e LCL. •f less 1%, 5 days. •g less 2% for cash. •h less 2% disc, 10 days. •j add 2% sales tax.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	 B quality	EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 500 lb. lots
Atlanta	78%	80%g	$0 2695
Baltimore	74%d	76%d	2695
Birmingham	82%	82%	2495
Boston	72+10%p	72+10%p	2695
Chicago	72%	72%	2495
Cincinnati	74%	74%	2695
Cleveland	74 2 10%	74 2 10%	2695
Dallas	76%	76%	2770
Denver	73 5%	73 5%	2695
Detroit	74 10 10%	74 10 10%	2695
Kansas City	76 10 10%	76 10 10%	2695
Los Angeles	70%	76%e	2690
Minneapolis	71 10%	71 10%	2695
Montreal	40 10 5%b	40 10 5%b	23 20h
New Orleans	76%d	76%g	2695
New York	79%l	79%l	5030g
Philadelphia	76 10%n	76 10%o	2695
Pittsburgh	72%	72%	2695
St. Louis	72 10 10%mo	72 10 10%mo	2695
San Francisco	60%	73%	2695
Seattle	$8 85 11 55hiq	$6 41 8 67hjp	2695
Toronto	7 10 10 65n	6 45 9 70n	

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S.; $1.75 per 100 lbs. higher in Canada.

Glass: •a Jobbers' list price per box, 14 x 20, ss, $42.75 for A quality, $37.50 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. •b sales tax extra. •c 77% for single strength. •d From 6 15 52 list. •e 77% for double strength. •f Single strength; double strength, 83%. •g From 8 1 58 list. •h Ss ds, 40-in. •i 20 boxes min. •j CL quantity. •k eff. 12 58. •l eff. 10 15 58. •m less 2% disc, 10 days. •n less 1% disc, 10 days. •o add 2% sales tax. •p less 1% for cash. •q less 2% for cash.

Explosives: * Cartridges of 1¼" diameter or over, in standard lengths. •g deliveries in certain areas must be by truck or by truck and boat, requiring extra charge. •h F.o.b. Beloeil (near Montreal), per 100 lb., lots under 2000#, wood cases, forcite, 40%. Forcite 60%, $23.80. In fiber cases: forcite 40%, $23.20; forcite 60%, $24.95.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C L 300,000 lb. lots	10,000 lb. lots	2,000 lb. lots	200 lb. lots
Group 1*	$0 2095	$0 2195	$0 2545	$0 2695
Group 2†	2170	2270	2620	2770

* All areas except those in Group 2 and N.J. cities of Bayone, Hoboken, Jersey City, No. Bergen, Union City and Weehawken. † Florida counties of Manatee, Hardee, Highlands, Okeechobee, St. Lucie and south thereof; Idaho; Maine; Montana; New Mexico counties of Catron, Socorro, Lincoln, De Baca, Roosevelt and south thereof; Texas counties of Bailey, Lamb, Hale, Floyd, Motley, Cottle, Hardeman, Foard, Knox, Haskell, Jones, Taylor, Coleman, McCulloch, San Saba, Burnet, Williamson, Milan, Robertson, Leon, Houston, Angelina, Nacogdoches, Shelby and south thereof.

PILES, TIES

PILES

Prices per linear foot, fir and pine, rough peeled, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine under fifty feet based on freight from mid-South, over fifty feet, on freight from deep South.

Dimensions	Points	Length	By Rail Pine*§ R	 Fir R
12" at butt	6-in.	30 to 39-ft.	$0 32a	
12" 2-ft. from butt	6-in.	40 to 44-ft.	69	
12" 2-ft. from butt	6-in.	45 to 49-ft.	73	
12" 2-ft. from butt	6-in.	50 to 54-ft.	77	
12" 2-ft. from butt	6-in.	55 to 59-ft.	81	
14" 2-ft. from butt	6-in.	60 to 64-ft.	87	
14" 2-ft. from butt	6-in.	65 to 69-ft.	92	
14" 2-ft. from butt	6-in.	70 to 74-ft.	1 02	1 07
14" 2-ft. from butt	6-in.	75 to 79-ft.	1 07	1 07
14" 2-ft. from butt	5-in.	80 to 84-ft.	1 17	1 10
14" 2-ft. from butt	5-in.	85 to 89-ft.	1 27	1 15 1 20

* Pine piling over 90 feet available only in limited quantities. § ASTM Class B. a, trucked in from N. J.

RAILWAY TIES

Prices f.o.b. per tie box carload lots:

		6" x 8" x 8' Untr.	 Tr.	7" x 8" x 8'6" Untr.	 Tr.
Birmingham*	Hardwood, Grade 3	$1 70	$2 55	Gr. 5 $2 25	$3 33
	Grade 2	1 50	2 35	" 4 2 10	3 18
	Grade 1	1 15	2 00	" 3a 1 70	2 78
Chicago	Red Oak		4 00a		4 50a
New York	S. L. Sap Pine	2 50	4 00	3 00	5 00
	Mixed Oak	2 50	4 00	3 00	5 00
Philadelphia	Red Oak	2 85 4 05	4 40 4 60	3 20 3 40	4 40 4 60
St. Louis	Mixed Oak	2 65	3 40a	2 90h	3 75ah
San Francisco	Douglas Fir	2 72ef	3 84ef	3 64ef	5 05ea

Tr. Treated; Untr. Untreated. a Creosoted. e Empty cell. f Green f.o.b. cars. g 7 x 9 x 8'6". * Add 75¢ tie freight charge to Birmingham. •h 7" x 9" x 9½'.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$5 02
Chlorine cylinders, liquid, per lb. f.o.b. works	11
Calcium chloride, 77 80%, flaked, 100-lb. paper bag, f.o.b. works, ton	31 00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	2 65
Soda ash, 58%, in paper bags, per 100 lb. dense	1 90
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	2 05
Sulphate of copper, in bags, 99%, per 100 lb. f.o.b. works	21 20

CIRCLE J-8 READER SERVICE CARD >

CATERPILLAR

GIANT PRODUCTION!
LOW-COST OPERATION!
GET 'EM BOTH IN THE MIGHTY D9!

From every angle the Cat D9 Tractor is a "take-charge" giant . . . capable of giant production. Here's 30 tons of steel engineered and manufactured into a rugged, reliable machine that refuses to falter when the going gets tough.

The heavy-duty, seven-roller track frame is built to take the punishment of heavy loads. "Hi-Electro" hardening of wear areas of the undercarriage gives extra dependability. Extra-strong frame and final drive form a backbone built for long life under the severest operating conditions.

The turbocharged D9 Engine puts out 320 HP at the flywheel. 'Dozing, pulling or pushing – this means peak production on any job. Despite its size and power, the D9 is easy to operate. Hydraulic boosters provide power for steering, braking and master clutch use. Finger-tip control helps keep the operator at top efficiency.

The D9 is easy and economical to maintain. The exclusive Caterpillar oil clutch operates up to 2,000 hours – one whole season – without adjustment. And it needs adjustment no more frequently than ordinary clutches need replacement. Proper track tension is quick and easy to apply with Cat hydraulic adjusters.

NEW FEATURES FURTHER REDUCE MAINTENANCE COSTS: Lifetime lubricated rollers and idlers – tested for 2½ million hours – need no servicing until rebuilding. New dry-type air cleaner removes at least 99.8% of all dirt and dust from engine intake air throughout every service hour. Cleaner can be serviced in 5 minutes; filter element re-used.

A complete line of attachments and scrapers make the mighty D9 a versatile profit-maker. Scrapers available for use with the D9 are the No. 463 Series C, which carries 22 cu. yd. struck, 28 heaped, and the No. 491 (27 cu. yd. struck, 34 heaped). Fast loading, efficient ejection and spreading step-up cycle time with either one. A full line of bulldozers and controls insures the right combination to handle any 'dozing job. Two rippers are available . . . the No. 9 for normal ripping and the Kelley Ripper with single tooth for extra-deep penetration.

These are just a few of the plus features found in the D9 Tractor – features that make the D9 "King of the Crawlers." The real proof is in a demonstration on your job. See for yourself. Call your Caterpillar Dealer now.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

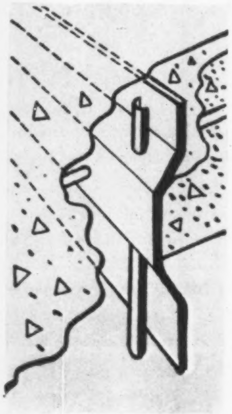
CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

GET TOP PRODUCTION WITH A TAKE-CHARGE D9

Illinois Tollway contractors find economy in *Kapco* tongue & groove joints

The new Illinois Tollway provides the motorist with four to six lanes of 10-inch reinforced concrete, plus 11-foot outside shoulders for emergency parking and 4 to 5-foot inside shoulders for extra safety in passing.



KAPCO TONGUE AND GROOVE JOINTS — the preformed mastic board that offers these *plus features at real economy* — were used on this modern highway:

- **Rigidity.** More than sufficient strength to resist the deforming forces of concrete placement.
- **Weatherproof.** Won't rust, rot or absorb more than 8% water by test.
- **Durability.** Provides effective bearing surface between slabs to prevent joint spalling . . . absorbs slab expansion without extrusion.
- **Economy.** Less expensive than steel. Proved over the years for its non-deforming efficiency as a load transferring medium.

WRITE Dept. C-9 for literature and prices.

NEW AIRPORT T & G JOINT! Also available in new trapezoid dimensions for airport installations.

PRESSTITE
SEALING COMPOUNDS

PRESSTITE DIVISION
AMERICAN-MARIETTA COMPANY

KAP

3740 CHOUTEAU AVENUE • ST. LOUIS 10, MISSOURI

2nd Quarterly Cost Roundup

Highway Prices & Indexes

U. S. Composite Mile Price Index

U. S. Bureau of Public Roads, 1925-29 = 100

Year	Excavation[1] 17,491 cy[3] Bid price	Excavation Sub-index	Surfacing[2] 3,726 sy[3] Bid price	Surfacing Sub-index	Structures: Reinf. steel 16,000[3] lb. Bid price	Structures: Struct. steel 4,325[3] lb. Bid price	Structures: Struct. concr. 68[3] cy Bid price	Structures: Comb. Sub-index	BPR Composite Mile Index	ENR Construction Cost Index
25-'29	$0.35[†]	100.0	$2.22[†]	100.0	$0.052[†]	$0.067[†]	$22.15[†]	100.0	100.0	100.0
1926	0.38	103.7	2.20	103.1	0.053	0.074	22.76	103.7	103.4	100.5
1932	0.18	55.0	1.44	64.8	0.034	0.046	15.33	68.0	61.0	75.6
1939	0.21	59.8	1.73	77.8	0.044	0.059	19.13	85.9	72.6	113.8
1948	0.35	99.1	2.65	119.3	0.075	0.113	38.79	164.7	119.0	167.2
1949	0.38	197.4	3.40	153.1	0.104	0.146	47.36	210.3	145.8	230.5
1955	0.36	101.9	3.67	165.3	0.116	0.165	51.99	232.8	152.8	318.8
1956	0.38	108.2	3.89	175.5	0.131	0.202	54.33	253.8	163.3	334.6
1957:	0.40	113.5	4.02	181.2	0.137	0.218	56.12	267.0	170.0	349.8
1958:	**0.39**	**112.5**	**4.02**	**181.1**	**0.130**	**0.193**	**54.92**	**253.3**	**167.5**	**366.8**
Q1	0.39	110.3	4.02	181.3	0.131	0.201	54.99	255.6	167.1	359.7[4]
Q2	0.40	114.5	4.03	181.7	0.130	0.192	54.85	252.9	168.5	365.9[4]
Q3	0.39	111.4	3.97	179.0	0.130	0.186	54.55	251.1	165.7	373.8[4]
Q4	0.40	113.7	4.04	182.2	0.129	0.191	55.28	253.7	168.5	373.9[4]
1959:										
Q1	0.40	113.4	4.02	181.3	0.128	0.187	54.93	251.2	167.6	377.6[4]
Q2										384.2[4]

[1] Common excav. plus other excav. Items expressed as equivalent common excav.
[2] Portland-cmt. concr. plus other surfacing expressed as equivalent portland-cmt. concr.
[3] Fixed quantities used for establishing price trend. [†] Prices used for base year index.
[4] Last month of quarter.

SOUTH

Florida Average Unit Prices & Index

Year	Excavation[1] cy	Lime Rock Base[2] sy	Bituminous Mat'l gal	Hot Bit. Mixes ton	Stabilizing sy	Struc. Conc cy	Reinf. Steel lb	PCC Pavement cy	Composite Index
1949	0.34	1.32	0.130	5.30	0.062	50.45	0.095	18.90	94.9
1950	0.35	1.29	0.140	5.20	0.150	51.22	0.101	17.18[†]	100.0
1955	0.42	1.34	0.137	5.69	0.171	55.43	0.112	18.82	109.7
1956	0.52	1.44	0.146	5.72	0.201	59.79	0.132	17.18	122.2
1957	0.49	1.57	0.145	6.12	0.268	61.35	0.133	18.72	127.2
1958	**0.58**	**1.45**	**0.134**	**6.02**	**0.235**	**54.77**	**0.124**	**18.81**	**126.2**
Q 1	0.43	1.49	0.133	5.76	0.162	60.90	0.122	17.73	114.5
Q 2	0.57	1.30	0.126	5.67	0.226	41.55	0.132		116.9
Q 3	0.63	1.51	0.135	6.22	0.304	66.97	0.122	21.78	139.0
Q 4	0.58	1.42	0.142	6.87	0.219	67.32	0.120	19.19	132.6
1959									
Q 1	0.57	1.39	0.140	6.80	0.201	72.73	0.128	22.96	135.4

Bid items represent 51.5% of total highway construction cost. [2] 8.5-in [†] Based on bids in 2nd & 4th quarters 1949

Kentucky Average Unit Prices & Index

Item	Unit	Point Weight*	Base '38-'41	Average Unit Price 1946	1949	1956	1957	1958
Grading								
Roadway excavation	cy	0.175	$0.2970	$0.570	$0.560	$0.51	$0.46	$0.66
Class "A" concrete	cy	0.070	17.26	36.90	46.84	55.22	55.69	61.82
R.C. pipe culv, 24-in	lf	0.035	2.905	4.60	4.88	5.55	6.25	6.58
Surfacing								
Rock or gravel	ton	0.126	1.880	3.35	3.10	3.36	3.59	3.40
Oils	gal	0.021	0.0845	0.115	0.152	0.148	0.155	0.164
Ready-mix	ton	0.126	6.158	5.85	6.57	6.90	7.03	7.27
Port cem conc	sy	0.042	1.802	3.31	3.09	4.65	4.92	5.60
Structures								
Excavation	cy	0.014	1.145	2.98	5.25	4.17	5.88	6.13
Class "A" concrete	cy	0.049	17.26	36.90	46.84	55.22	55.69	61.82
Structural steel	lb	0.035	0.5090	0.103	0.157	0.230	0.312	0.232
Reinforcing steel	lb	0.007	0.04075	0.069	0.060	0.133	0.138	0.136
Total cost aggregate			70.0	120.51	133.18	146.98	154.85	167.80
Composite Index			100.0	172.2	190.3	210.0	221.2	239.6

* Multiply times price relative (ratio of current price to base price) to get component of current cost aggregate. The total current cost aggregate, divided by 70.0 (total cost aggregate in base period 1938-41) and multiplied by 100 gives current year's index, based on 1938-41 = 100.

Virginia Unit Prices and Indexes

Year	Excavation $ cy	Excavation Sub-Index	Surfacing $ sy	Surfacing Sub-Index	Structures: Reinf. Steel $ lb	Structures: Struct. Conc. $ cy	Structures: Sub-Index	Composite Mile Index
1937-41	$0.282	100.0	$1.012	100.0	$0.0494	$22.13	100.0	100.0
1946	0.53	187.9	2.05	202.6	0.0790	49.36	209.6	198.9
1949	0.55	195.0	2.01	198.6	0.1040	50.92	225.9	203.6
1955	0.60	212.8	2.14	211.5	0.1229	58.56	261.2	223.4
1956	0.79	280.1	2.16	213.4	0.1500	70.59	315.7	261.3
1957	0.70	248.2	2.42	239.1	0.1513	73.63	327.1	262.7
1958	0.54	191.5	2.11	208.5	0.1377	66.24	294.9	222.2

NEW ENGLAND AND MIDDLE ATLANTIC

Connecticut Contract Price Indexes

Date	Structures	Grading drainage	Trunk line	Concrete pavement	Town aid	Composite
1939	100.00	100.00	100.00	100.00	100.00	100.00
1940	93.76	94.19	92.78	98.54	86.41	93.93
1945	138.65	175.09	160.97	138.04	168.62	151.47
1949	196.49	184.51	171.42	190.96	163.09	184.64
Jun '56	289.62	294.43	239.53	267.90	265.94	270.98
Dec '56	323.74	317.54	245.31	270.01	276.53	288.06
Jun '57	327.46	319.46	245.88	272.87	263.64	289.19
Dec '57	270.97	293.55	243.48	261.15	253.97	263.43
Jun '58	239.80	267.73	218.04	249.19	243.02	239.91
Dec '58	235.06	254.02	213.79	245.36	229.65	233.62

New York "Composite Mile" Costs

Year	Exc. uncl	Portland cement	Structural concrete	Steel bar reinf.	Structural steel	Cement-concrete pavement	Total cost of composite	Index 1940 = 100
1940							$16,116	100.0
1946	$0.60	$2.71	$33.30	$0.071	$0.116	$8.29	26,230	162.8
1949	69	3.56	41.71	125	145	11.25	32,688	202.8
1955	55	4.43	47.95	14	16	13.05	34,610	214.8
1956	83	4.52	51.65	15	21	13.46	40,652	252.2
Q1	98	4.58	52.73	16	20	16.43	46,323	287.4
Q2	78	4.40	52.34	15	21	12.73	38,965	241.8
Q3	78	4.77	43.09	14	20	13.62	39,516	245.2
Q4	83	4.58	53.38	16	22	14.34	41,883	259.6
1957:								268.5
Q1	91	4.98	57.24	15	18	14.62	44,072	273.4
Q2	82	4.35	68.13	13	20	14.75	42,182	261.7
Q3	75	4.81	56.25	17	24	14.74	39,331	258.3
Q4	76	5.14	59.30	15	15	13.30	40,469	251.1
1958:								257.2
Q1	1.03	5.09	52.67	15	18	13.16	44,665	277.1
Q2	90	5.36	51.88	15	15	13.23	43,012	266.8
Q3	88	4.98	54.49	14	15	13.06	41,513	257.5
Q4	62	4.75	49.40	.17	.16	12.85	36,664	227.5
1959:								
Q1	.70	5.28	48.12	.15	.16	14.80	39,772	246.7

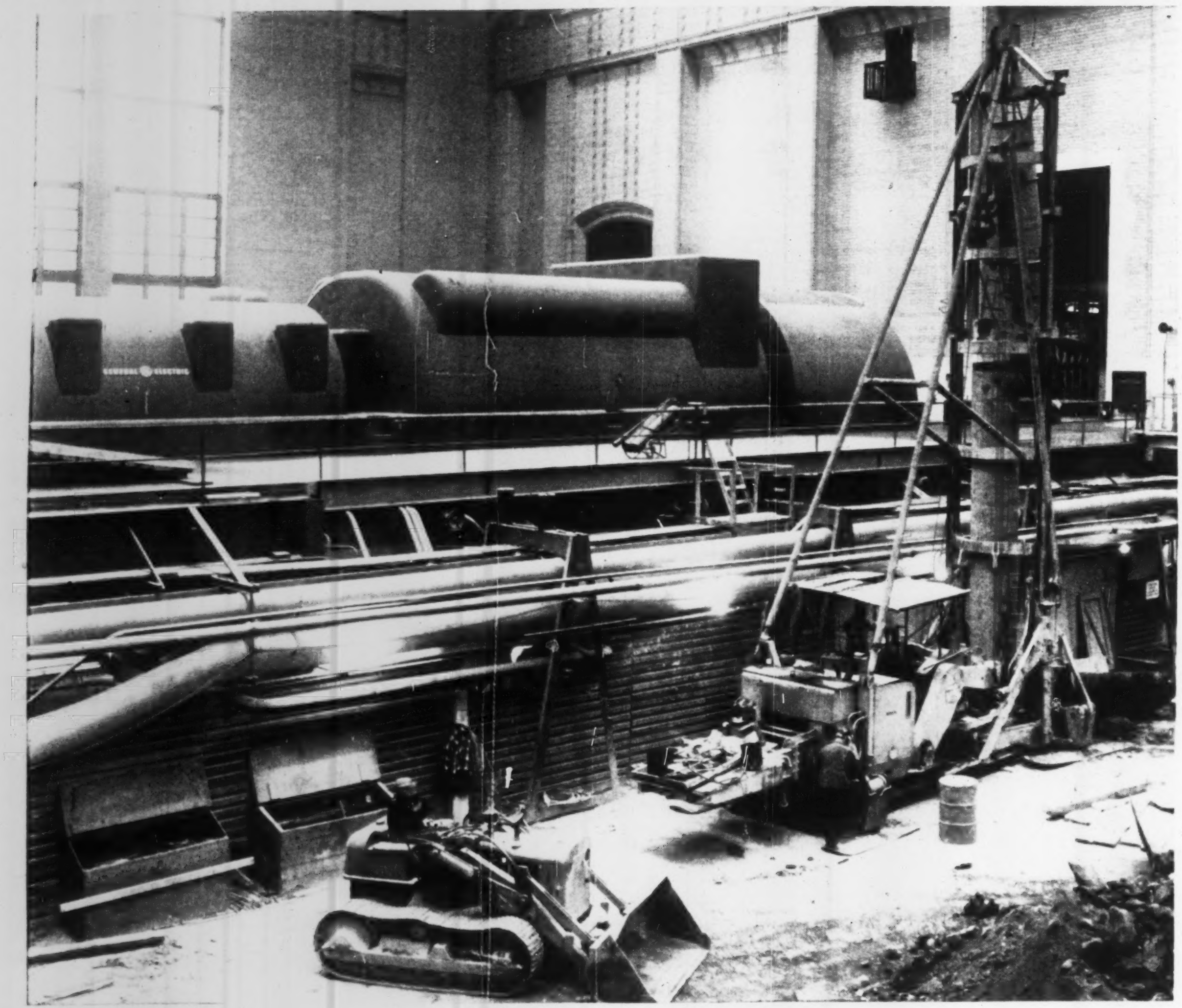
Pennsylvania Average Unit Prices & Index

Year	Excavation Cl 1 $ cy	Excavation Cl 2 $ cy	CR aggr base 8" $ sy	Bit surf DP-1 $ sy	RCC pvmt 9" $ sy	Concrete Cl A $ cy	Concrete Cl B $ cy	Reinf steel bars $ lb	Annual Index '40 = 100
'40 H1	$0.449	$1.779	$0.799	$0.734	$2.586	$22.151	$18.059	$0.041	
H2	0.417	1.680	0.808	0.695	2.515	22.522	17.601	0.045	100
'46 H1	0.833	3.308	1.667	1.007	3.796	48.785	41.397	0.079	
H2	0.948	3.844	1.752	1.284	3.995	44.397	37.776	0.074	171
'49 H1	0.965	4.042	1.986	1.241	4.985	75.156	45.747	0.113	
H2	0.834	3.823	1.771	1.199	4.744	54.130	40.820	0.108	193
'55 H1	0.604	2.664	1.764	0.950	5.333	48.868	43.488	0.114	
H2	0.722	4.409		1.016	5.254	56.127	44.305	0.118	199
'56 H1	0.964	4.243	1.861	1.500	5.715	53.208	41.998	0.122	
H2	0.705	2.960	2.053	1.223	5.604	59.870	43.177	0.138	211
'57 H1	0.856	3.632	1.836	1.153	5.755	58.320	42.588	0.128	
H2	0.676	3.079	1.793	1.153	5.901	60.634	42.843	0.130	214
'58 H1	0.792	3.607	2.082	1.031	6.032	56.560	42.956	0.126	
H2	0.741	3.502	1.958	1.031	5.840	58.740	43.939	0.124	206

Mississippi Average Unit Prices and Index—1937-'41=100

Year	Grading: Exc. uncl[a] $ cy	Grading: Topping[a] $ cy	Drainage: B conc culv[b] $ cy	Cement concrete pavement: Plain cmt $ sy	7-5-7" RCC $ sy	8-6-8" RCC $ sy	9-6-9" RCC $ sy	Bit pavement: Asph. prime $ gal	Bit pavement: Cover mtls $ cy	Gravel: Surf course $ cy	Gravel: Stab aggr $ cy	Structures: Conc. B&C bri $ cy	Reinf stl. bri $ lb	Str stl $ lb	Timber treated $ Mbm	Piling timb[f] $ lf	Piling stl $ lf	Composite Index
1940	$0.212	$0.42	$20.48	$1.34	$1.51	$1.76	$1.68	$0.064	$4.55	$2.18	$1.56	$23.36	$0.04	$0.05	$124.88	$1.04	$	100.36
1946	0.311	0.62	42.46	2.72	2.28	2.38	2.49	0.11	5.25	2.85	4.25	41.22	0.07	0.085	211.11	2.34	3.21	163.42
1949	0.312	0.71	45.852	3.64	2.99	3.269	3.291	0.155	7.076	2.337	2.218	46.534	0.102	0.114	232.91	2.133	2.735	182.69
1955*	0.276	0.76	45.14	....	2.13[c]	2.50[c]	2.42[c]	0.157	6.43	2.90	3.19	47.25	0.115	0.12	255.75	2.02	3.66	180.67
1956	0.271	0.78	44.49	....	2.54	2.99	2.89	0.156	6.43	2.68	3.17	53.61	0.123	0.17	278.28	2.03	4.29	189.96
1957	0.316	0.90	48.61	....	2.45	2.88	2.79	0.159	6.88	3.11	3.36	63.08	0.134	0.19	313.97	2.20	4.33	207.74 R
1958	0.304	0.81	51.24		2.42	2.85	2.76	0.165	7.43	2.92	3.72	60.89	0.136	0.18	288.78	2.31	5.16	203.90
Base prices	34.8%		8.2%	20.2%				9.6%		4.1%		23.1%						
37-41	0.235	0.346	20.53	1.64	1.48	1.65	1.60	0.094	4.56	1.98	1.67	23.04	0.043	0.052	121.27	1.19	1.80	100.00
Sub wgt %	64.1	35.9	8.2	0.3	34.8	1.6	63.3	50.3	49.7	32.1	67.9	44.9	12.4	27.1	1.5	0.6	7.5	

* First half of 1955. [a] incl haul [b] incl D conc [c] first half of yr only [d] convrtd from 6" uniform [e] convrtd from 8" uniform [f] creosoted [R] revised



BENOTO EDF 55

Solves Difficult Foundation Problem

An expansion at Commonwealth Edison Company's Crawford Power Plant, Chicago, required installation of foundations for a new 305,000 KW turbo generator without interrupting the service from existing units.

An operating turbo generator only 30 feet away from the new unit was supported on a spread footing on clay. It was essential to install 26 caissons for the new cross compound unit **with an absolute minimum of vibration or settlement.** Caissons 35" and 39" in diameter were designed to bear on rock at depths exceeding 70 feet.

The Benoto EDF 55 caisson digging machine met these requirements. Its unique use of a steel shaft casing eliminated possibility of settlement. It also excavated caissons for a boiler house and a 375' high chimney—in all, 105 caissons on this project.

- Consulting Engineers: Sargent & Lundy, Chicago, Ill.
- General Contractors for Substructure: Ragnar Benson, Inc., Chicago, Ill.
- Foundation Contractor. Lake States Engineering Corp., Chicago, Ill.

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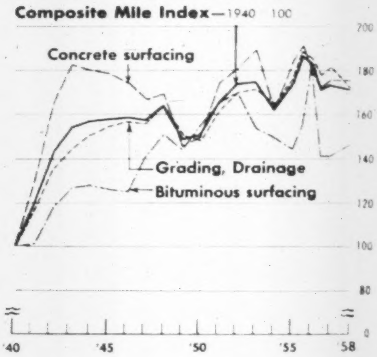
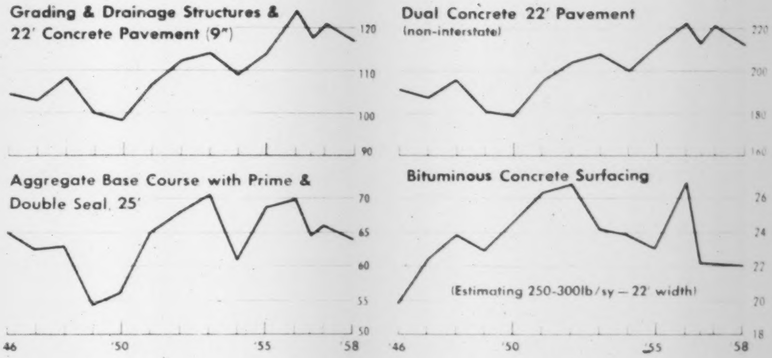
MIDDLE WEST

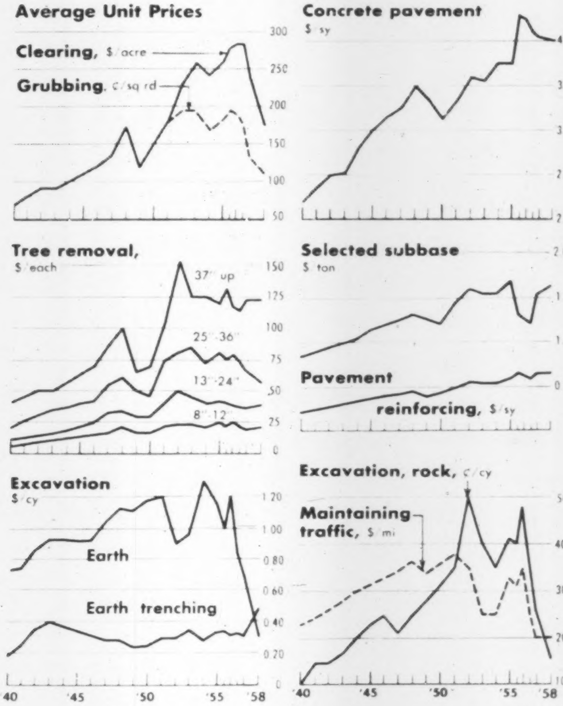
Michigan Highway Costs

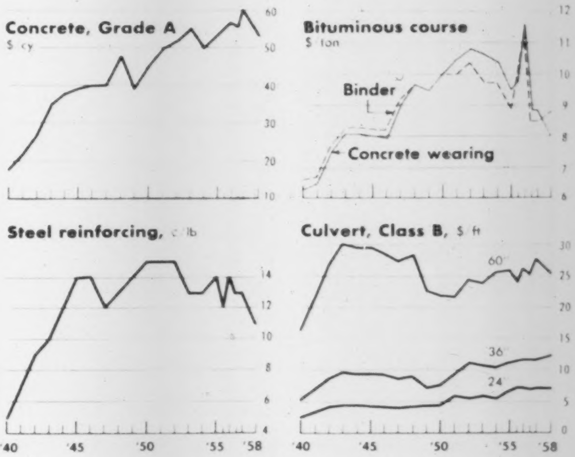


Cost per mile In thousands of dollars



Average Unit Prices





Illinois Price Index

Year	Grading 14%	Surfacing 58%	Structures 28%	Composite 1937-41 = 100
1919	186	117	124	129
1926	110	116	92	108
1932	63	75	57	68
1939	108	104	92	101
1946	193	122	150	142
1949	141	139	219	162
1956	163	145	313	195
1957	207	155	353	219
1958	159	154	300	196

For 1919-56, see ENR Oct. 17, '57, p. 107

Indiana Unit Prices

Item	Unit	Average Price 1958	Average Price 1957
Excavation, common (a)	cy	$0.59	$0.55
Excavation, Special borrow (b)	cy	0.68	0.62
Reinf conc pavement, 10-in.	sy	5.09	4.75
Asph conc, hot, binder	ton	7.28	6.71
surf, type B	ton	7.40	7.13
Subbase, type I or II	cy	2.30	2.21

(a) over 100 Mcy
(b) over 50 Mcy
(c) 9-in.

WEST OF THE MISSISSIPPI

Colorado Average Unit Prices and Index

Item	Unit	Quantity	Unit Price 1949	1957	1958	1st Q 1959
Excavation, unclass	cy	10,630	$0.141	$0.350	$0.344	0.351
Overhaul	stay	64,112	0.014	0.009	0.008	0.007
	ydmi	6,055	0.122	0.104	0.065	0.091
	tnmi	12,188	0.061	0.072	0.066	0.064
Sub-base	t	2,968*	0.521	0.471	0.524	0.482
Gravel, or rock surf	t	1,976	0.894	0.991	1.082	0.954
Asphalt, liquid	gal	10,252	0.151	0.186	0.168	0.177
Asph surf, plant mix	t	279	4.500	3.144	3.219	3.338
Concrete pavement	sy	449	3.512	3.578	3.728	3.831
Concrete	cy	136	48.564	56.153	1.601	51.739
Steel, struct	lb	7,314	0.133	0.205	0.186	0.183
Culvert, CMP	lf	300	5.823	8.423	9.251	9.785
Composite Mile Index			100.0	97.3	96.1	97.2

* incl all matl whether bid as sub-base or select borrow; aver of all diam pipe used

Iowa Average Unit Prices and Index

Item	Unit	Average Contract Unit Prices (dollars) 1949	1953	1954	1955	1956	1957	1958
Grading	cy	0.206	0.192	0.149	0.158	0.160	0.151	0.171
Pavement, standard concrete	sy	3.728	4.197	4.044	3.928	4.227	4.522	4.931
Pavement, type A concrete	sy	2.903	2.908	3.532	3.237	2.530	3.001	2.750
Pavement, type A asphaltic	ton	6.977	7.919	7.131	7.027	6.834	6.057	7.145
Gravel surface	cy	1.341	1.497	1.516	1.307	1.487	1.726	1.662
Crushed stone surface	cy	2.617	2.889	2.794	2.675	2.632	2.698	3.201
Concrete masonry	cy	43.643	47.909	41.235	43.891	47.910	44.999	47.749
Steel, reinforcing	lb	0.121	0.121	0.102	0.107	0.118	0.123	0.121
Steel, structural	lb	0.151	0.171	0.161	0.155	0.191	0.243	0.279
Piling, untreated	lf	1.610	1.576	1.444	1.558	1.564	1.589	1.711
Piling, creosoted	lf	2.970	3.550	2.767	2.770	2.787	2.719	2.596
Excavation, struc, cl 20	cy	3.733	3.047	2.370	2.644	2.691	2.248	2.576
Excavation, struc, cl 21	cy	17.277	18.411	16.447	16.361	16.929	18.685	16.634
Composite index*		100.0	106.1	95.5	95.4	99.8	102.6	118.0

* Computed by ENR, based on average unit prices above and average quantities during 1948-57

Nebraska Unit Prices & Index

Year (Weight)	Excavation (18%) $ cu. yd.	Culvert concrete (5%) $ cu. yd.	24" Culvert pipe (2%) $ lin. ft.	Class "A" gravel surface (20%) $ cu. yd.	PCC pavement (15%) $ sq. yd.	Asphaltic oil (15%) $ gal.	Bridge concrete (9%) $ cu. yd.	Structural steel (16%) $ lb.	Composite Index 1937-41 = 100
1937	$0.157	$15.80	$2.01	$1.09	$1.93	$0.081	$19.51	$0.055	106.2
1940	0.097	13.49	1.92	1.02	2.08	0.077	17.64	0.049	93.2
1946	0.184	35.95	2.78	1.80	2.40	0.099	42.64	0.094	162.4
1949	0.202	43.53	4.15	1.97	3.53	0.142	54.03	0.144	207.1
1955	0.168	45.95	4.68	2.08	3.59	0.143	51.92	0.166	212.2
1956	0.187	44.76	5.05	2.21	3.57	0.155	58.06	0.231	241.1
1957	0.191	43.17	5.19	2.31	3.44	0.163	52.34	0.219	237.7
1958	0.207	44.71	5.23	2.39	3.90	0.158	51.04	0.170	229.8

Oklahoma Average Unit Prices & Index

Year & Quarter	Excavation Cl D $ cy	Concrete Bridge $ cy	Culv. $ cy	Reinf Steel $ lb	Struc Steel $ lb	Asph Conc Pave $ ton	PCC Pave 8-in. $ sy	Stab Aggr Base $ ton	Asph Oil $ gal	Composite Index
1940	0.1188	18.04	15.71	0.0420	0.0516	5.400	1.620	1.27	0.092	100.0
1949	0.329	42.32	33.89	0.0963	0.1197	7.150	2.855	2.03	0.1335	180.7
1955	0.362	43.40	31.81	0.1070	0.1385	7.672	4.04	1.65	0.1250	185.7
1956	0.366	42.98	33.74	0.1220	0.1531	7.460	4.13	1.93	0.1367	196.5
1957	**0.361**	**43.77**	**33.32**	**0.1254**	**0.1597**	**7.270**	**4.13**	**2.15**	**0.1467**	**201.7**
Q1	0.365	42.64	32.98	0.1261	0.1504	7.330	3.96	2.01	0.1461	197.7
Q2	0.378	43.45	33.47	0.1264	0.1710	7.86	4.18	2.28	0.1474	209.1
Q3	0.389	46.82	34.53	0.1274	0.1730	8.18	4.43	1.96	0.1461	209.2
Q4	0.335	44.17	32.95	0.1238	0.1487	6.78	4.15	2.23	0.1467	197.2
1958*	**0.294**	**43.23**	**32.35**	**0.1199**	**0.1506**	**7.797**	**4.01**	**1.89**	**0.1398**	**188.4**
Q1	0.270	42.07	30.77	0.1197	0.1486	5.686	3.90	1.54	0.1362	172.1
Q2	0.309	42.89	32.26	0.1213	0.1583	8.192	4.06	1.99	0.1406	194.0
Q3	0.272	43.84	33.71	0.1175	0.1438	7.811	4.16	1.55	0.1305	181.3

* Average of nine months

South Dakota Unit Prices & Index

	Roadway excav. $ cy	Cr. grav. surf. $ t	Liq. asph. $ gal	Plt. mix bit. surf. $ t	Conc. Cl A $ cy	Reinf. steel $ lb	Struct. steel $ lb	Composite Index '40 = 100
1940	$0.120	$0.59	$0.078	$1.49	$19.11	$0.044	$0.050	100.0
1946	0.214	1.13	0.101	2.91	38.49	0.085	0.095	177.6
1949	0.197	1.40	0.159	3.83	54.01	0.125	0.135	217.0
1955	0.179	1.01	0.129	2.48	49.09	0.122	0.163	177.0
1956	0.208	1.16	0.124	3.27	52.79	0.136	0.176	198.8
1957	0.222	1.02	0.152	3.01	49.96	0.131	0.182	205.6
1958	**0.226**	**1.90**	**0.104**	**3.20**	**52.06**	**0.124**	**0.179**	**184.5**
Q 1	0.188		0.120	3.97	57.44	0.120	0.177	179.6
Q 2	0.180	1.90	0.114	2.76	47.58	0.123	0.158	177.1
Q 3	0.228		0.110	4.25	52.06	0.130	0.180	175.9
Q 4	0.260		0.104	3.20	52.06	0.124	0.179	209.8
'59 Q 1	0.283	0.95	0.087	2.44	49.21	0.134	0.189	216.9

Wyoming Average Unit Prices and Index

Weight / Year	Excav common (39%) $ cy	Grav base* (29%) $ cy	Oil (9%) $ gal	Conc CIA (11%) $ cy	Struct steel (6%) $ lb	Timber treated piling (6%) $ lf	Comp. Index 40 = 100
1940	$0.125	$0.670	$0.067	$18.15	$0.067	$1.25	100
1946	0.250	1.263	0.093	33.61	0.108	2.105	186
1949	0.199	0.780	0.124	48.00	0.145	2.512	167
1955	0.243	1.152†	0.096	62.446	0.177	3.545	210
1956	0.293	1.404	0.120	65.014	0.251	3.182	245
1957	0.286	1.297	0.126	60.105	0.237	3.717	238
1958	0.257	1.116	0.094	60.287	0.191	2.969	209

* Surfacing and haul † Crushed Gravel Base Course (1" Max), type most used ‡ Asphalti Material AC (85-100), type most used

Oregon Composite and Sub-Indexes

Year	Grading	Cr rock surface	Bit mac surface	Asph conc pavement	Port cmt conc pave	Conc bridge & structs	Composite index
1940	100.0	100.0	100.0	100.0	100.0	100.0	100.0
'58 Q 1	166.1	125.3	178.6	110.2	279.7	286.9	166.1
Q 2	178.8	179.9	180.0	131.7	279.7	297.2	190.8
Q 3	169.7	179.1	190.4	116.0	268.7	304.3	188.7
Q 4	159.2	151.0	186.4	108.4	286.1	294.8	174.9
'59 Q 1	162.6	226.5	209.5	125.1	286.1	297.6	201.4

Arizona Average Bid Prices & Indexes

Year & Quarter	Roadway Excavation $ cy	Borrow $ ton	Aggregate Base $ ton	Plant Mix Surf. $ ton	Liq. Asphalt $ ton	Struc Conc Cl A $ ton	Bar Reinf Steel $ lb	CMP 24-in. $ lf	Composite Index
1940	0.38	0.31	0.53	1.67	16.63	19.26	0.048	2.72	100.0
1946	0.77	0.67	1.04	2.68	23.95	36.64	0.091	3.95	186.0
1949	0.79	0.36	1.03	2.92	32.01	43.80	0.112	4.89	198.8
1956: H1	0.62	0.37	1.10	2.70	40.75	46.27	0.126	6.06	217.8
H2	0.92	0.46	1.17	2.80	42.15	52.05	0.147	6.46	
1957: H1	0.91	0.35	1.15	2.72	43.08	47.23	0.140	6.47	218.4
H2	0.53	0.29	1.23	2.83	47.43	47.93	0.146	6.49	
1958: Q1	0.69	0.28	0.99	2.42	45.61	45.90	0.138	6.49	203.4
Q2	0.53	0.26	1.03	2.33	44.25	41.84	0.133	5.84	
Q3	0.80	0.24	1.21	2.64	44.25	43.20	0.133	6.61	
Q4	0.87	0.24	1.09	2.63	40.26	39.74	0.121	6.63	

California Average Unit Prices & Indexes

Year	Rdwy excav $ cy	Crush run base $ t	Plant mix surf $ t	Asph conc pave $ t	PCC pavement $ cy	PCC structures $ cy	Bar reinf steel $ lb	Structural steel $ lb	Price Indexes Hwy '40 = 100	Price Indexes Bridge‡ '39-'40 = 100
1940	$0.22	$1.51	$2.19	$2.97	$7.68	$18.33	$0.040	$0.083	100.0	99
1946	0.41	2.45	4.00	4.68	9.48	37.38	0.060	0.099	179.7	197†
1949	0.49	2.67	4.67	4.64	12.28	48.67	0.096	0.117	190.7	199†
'58 Q 1	0.•52	1.85	**	5.45	14.96	55.21	0.118	0.192	241.8	259
Q 2	0.48	1.73	**	5.67	13.77	54.44	0.125	0.158	231.0	268
Q 3	0.39	2.18	**	5.56	13.99	53.93	0.126	0.182	228.5	268
Q 4	0.52	2.10	**	5.74	13.55	55.20	0.122	0.165	238.5	259
'59 Q 1	0.41	1.82	**	5.37	14.00	49.40	0.108	0.165	216.1	245

† average of quarterly values * untrdt rock base substituted for crusher run at this point ** Combined with asphaltic concrete pavement in 4th quarter '56 ‡ Asphaltic & Bituminous Mixes beginning 4th quarter '56 •§ For items and weighted average 1939-40 prices see ENR Dec. 6, 1956, p. 115

Idaho Contract Unit Prices and Index

Year	Excav uncl $ cy	Sprinkling $ Mgal	Rolling $ hr	Crush-surf $ t	Asph all gr $ gal	Plant Mix $ t	Conc. Cl A $ cy	Reinf. steel $ lb	Comp. index '50 = 100
'50	$0.618	$1.11	$4.06	$0.95	$0.129	$1.92	$54.17	$0.112	100.00
'58 Q 1	0.482	1.49	7.12	0.934	0.179	2.99	67.43	0.155	105.8
Q 2	0.404	0.955	7.19	1.429	0.184	2.88	57.53	0.133	92.1
Q 3	0.437	1.245	6.16	1.077	0.177	3.33	61.58	0.155	97.0
Q 4	0.406	1.036	6.41	1.002	0.157	3.30	66.87	0.1466	90.9
'59 Q 1	0.659	0.988	8.22	1.104	0.167	3.12	73.68	0.1396	108.5

* Not used in index because distorted by small quantity and unusual conditions

Nevada Average Unit Prices and Index

Year	Road excav $ cy	Borrow $ cy	Gravel Type 1 $ ton	Liquid asph $ ton	Plantmix surface $ ton	Class AA concrete $ cy	Reinf steel $ lb	Composite Index 1955 = 100
1955	0.388	0.219	0.660	31.97	2.64	61.17	0.120	100.0
1956	0.506	0.300	0.845	39.86	2.48	78.98	0.144	118.2
1957	0.562	0.291	0.754	39.63	2.96	71.63	0.147	124.3
1958	0.535	0.241	0.683	35.86	2.49	71.37	0.142	113.3
1959 Q 1	0.511	0.260	0.690	31.84	2.33	66.19	0.125	110.0

Washington Average Unit Prices and Index

Item	Unit	Average Unit Prices 1940	1946	1949	1956	1957	1958	1959 Q1
Excavation, common	cy	$0.164	$0.259	$0.305	$0.283	$0.297	$0.27	$0.19
unclassified	cy	0.209	0.313	0.442	0.470	0.400	0.42	0.40
solid rock	cy	0.506	0.905	1.030	1.467	1.742	1.36	1.15
Ballast	ton	0.619	1.268	1.842	1.306	1.080	1.18	1.07
Surface, crush, base	ton	1.172	2.004	2.686	1.361	1.296	1.22	1.50
top	ton	1.152	2.181	2.412	1.549	1.324	1.46	1.13
Asphaltic concrete	ton	6.141	6.438	7.798	6.665	6.757	6.51	5.38
Cem conc pavement	sy	1.800	2.572	3.018	4.528	3.993	4.05	4.05
Concrete, Cl A	cy	24.481	47.196	57.248	63.706	60.371	61.79	57.18
Steel, reinforcing	lb	0.051	0.070	0.102	0.123	0.136	0.125	0.116
structural	lb	0.078	0.138	0.193	0.266	0.284	0.241	0.255
Composite Index		100.0	163.0	214.5	214.1	226.4	211.4	189.0

Montana Average Unit Prices, Subindexes and Index

Year & Quarter	GRADING & DRAINAGE Excavation, uncl. $ cy [1]	CMP culvert $ lf [2]	Sub-index (37%)	SURFACE & BASE Top course Gr A $ ton [3]	Asphaltic oil $ gal [4]	Sel borrow base crse $ ton [5]	Sub-index (44%)	STRUCTURES Struc. Steel $ lb [6]	Treated Timber $ Mfbm [7]	Conc. Cl A $ cy [8]	Sub-index (19%)	Composite Index (100%)
1937-41	0.190	2.780	100.0	0.776	0.096	0.778	100.0	0.074	108.78	24.89	100.0	100.0
1946	0.360	4.380	182.2	1.050	0.110	0.880	122.9	0.120	270.00	41.57	185.7	156.8
1949	0.271	6.000	159.1	1.281	0.200	0.950	176.6	0.211	253.05	66.94	267.3	187.4
1955	0.267	7.057	165.9	1.139	0.155	0.792	145.8	0.219	298.27	51.72	267.4	176.3
1956	0.342	7.567	200.2	1.374	0.179	0.929	171.6	0.305	351.15	59.35	343.6	214.9
1957	0.273	6.928	167.1	1.154	0.183	0.752	158.6	0.246	361.96	51.37	299.5	188.5
1958: Q1	0.349	6.721	196.8	1.141	0.193	0.685	176.8	0.209	320.00	72.05	287.2	205.2
Q2	0.329	6.259	184.4	1.193	0.172	0.726	155.0	0.219	320.00	58.80	279.9	189.6
Q3	0.319	6.982	186.3	1.212	0.168	0.795	155.5	0.237	331.65	49.48	284.6	191.4
Q4	0.320	7.174	187.8	1.210	0.168	0.792	155.5	0.239	329.26	49.23	285.3	192.1

•[1] 78% of subindex •[2] 24-inch 22% of subindex •[3] 41% of subindex •[4] 43% of subindex •[5] 16% of subindex •[6] 48% of subindex •[7] 26% of subindex •[8] 26% of subindex

(Advertisement)

New Electronic Devices and Special Maps Cut Highway Mapping Costs, Speed Surveys

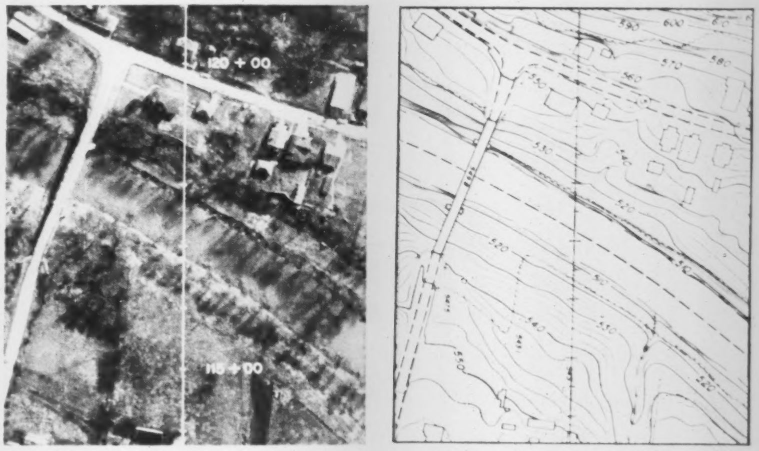
Aero crews in 12 states are providing data to Consulting Engineers, State Highway Departments

Throughout the United States, over rugged terrain and rolling plains, new highway programs are being completed faster . . . and at lower costs. One big reason *why* is the increasing use of aerial surveys coupled with lightning-like electronic computations during highway planning. Aero Service Corp., Philadelphia—a pioneer in the field—is busy now in 12 states from Alabama to California furnishing engineering services and data for preliminary and final location studies.

One survey near Huntington, W. Va., for J. Stephen Watkins, Consulting Engineers of Lexington, Ky., and Charleston, W. Va., is an interesting example. Fourteen miles of Interstate Route I-64—a four-lane divided highway—were to be hacked out of the foothills of the Alleghenies. Phase 1 of Aero's work included aerial photography at two scales—one for compilation of a 5 ft. contour map at 1″ = 200 ft. for location studies, and one for a 2 ft. map at 1″ = 50 ft for photogrammetric cross-sections. Phase 2 was field surveys to establish vertical and horizontal control data for the maps and cross-sections. This basic control was monumented for recovery and use during final staking and layout.

To save time and money, the penciled topographic sheets were not inked. Instead, photo copies were made and auto-positives delivered. These covered a swath ½ mile wide at a scale of 1″ = 200 ft., showing 5 ft. contours and all cultural details.

J. Stephen Watkins engineers studied the maps and refined the route location. Then Aero compiled 1″ = 50 ft. maps of a strip 500 ft. wide centered on the final route location. Roads, railroads, power and transmission lines, fences, bridges, culverts, retaining walls and woods lines were shown. As the design of interchange sites and grade separations were finalized, Aero added 2 ft. contours in these areas, and delivered maps at both 1″ = 50 ft. and 1″ = 30 ft.



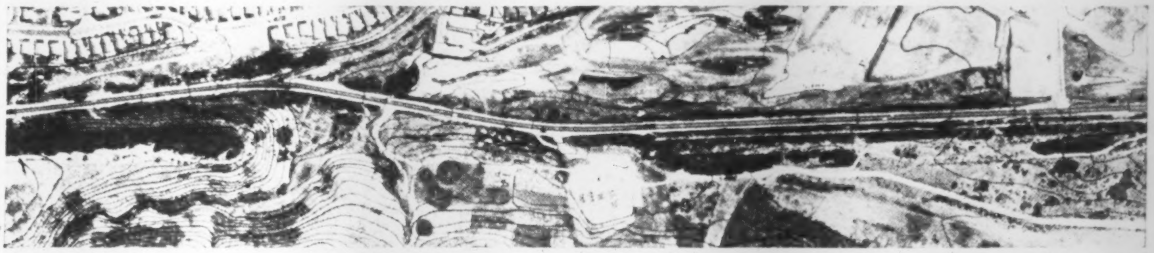
Air photo shows proposed highway center line. Topographic map of the same West Virginia area shows 2 ft. contours and portion of cross section locations.

After the maps showing the proposed centerline were received from the consultant, Aero took cross-sections by photogrammetric methods at 50 ft. intervals and at significant breaks in the terrain. Readings were made to a width of 300 ft., with wider sections as required by heavy cut or fill.

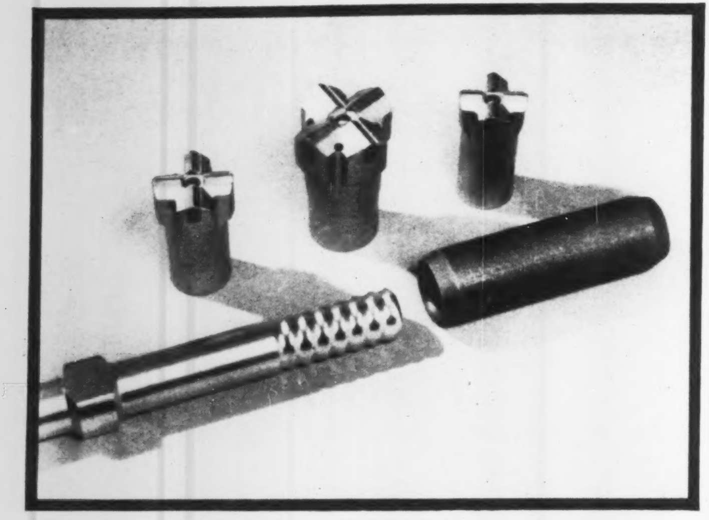
These cross-section data were punched in IBM Cards and verified. Aero fed these cards as input to a Dataplotter, which plotted cross-sections on Federal Aid cross-section sheets. Scale was 1″ = 10 ft., horizontally and vertically. Conferences between Aero's and client's engineers established the desirability of a smaller scale, and the sections for the latter portions were plotted at 1″ = 20 ft.

For the earthwork volume computations, Aero prepared the data so that it could be processed in Watkins' new Bendix G-15 computer. In other cases, Aero could process a duplicate set of punch cards in the IBM 650 Computer. Then Aero would deliver a tabulation showing cut, fill and net volume at each station, as well as accumulated cut, fill and net, plus slope stake offsets. Accuracy of all such computed volumes are checked with input data. Net result: substantial savings in time, manpower, money.

Aero's engineers will be glad to provide more information about its capabilities and to discuss photogrammetric engineering solutions of highway survey problems. Aero's fully integrated mapping services include topographic maps, photo-mosaics, and preliminary and detailed studies of engineering soils and geology for highway design (photo interpretation, drilling, sampling, testing and engineering reports). Aero Service Corporation's headquarters are at 210 E. Courtland St., Philadelphia 20, Pa., and its U.S. affiliate companies are in Tulsa and in Salt Lake City.



In California, Aero provided the State Highway Department with this Photo Contour Map. It will be used as a planning tool for preliminary studies. These Photo Contour Maps give highway planners a more complete picture of route possibilities.



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"Bit and rod life are well above average!"
"Uncouple by hand all the time!"
*"More rigid—drills straighter holes!"**

**Names of men quoted available on request*

The comments above are actual quotes from project managers, job superintendents, and drill superintendents who have tested new Coromant rope-thread bits and steels. They've learned, on-the-job, the benefits they—and you—can expect!

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2nd Quarterly Cost Roundup

Where the Building Dollar Goes

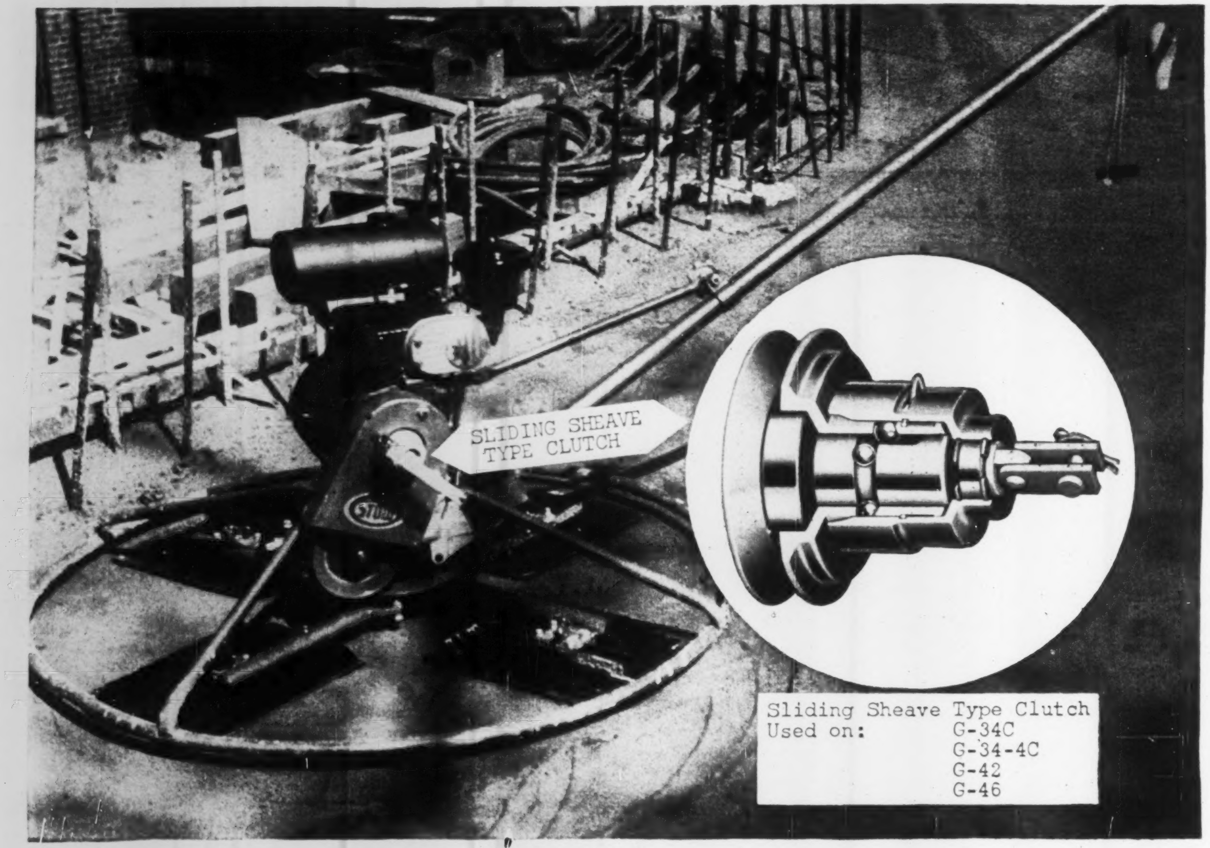
[This is the twelfth report in the series. Earlier reports were published in ENR Oct. 8, 1953; Sept. 29, 1955; July 5, 1956; Aug. 2, 1956; Dec. 1956; Oct. 17, 1957; Mar. 20, 1958; Sept. 18, 1958; Dec. 25, 1958; Mar. 19, 1959]

Unit and Ratio Costs Supplied through the Courtesy of The Austin Co. Seattle, Wash.; W. S. Bellows Construction Corp., Houston, Tex.; Henry Busse, Inc., Pittsburgh, Pa.; Gilbane Building Co., Providence, R. I.; J. A. Jones Constr. Co., Nashville, Tenn.; John W. Galbreath Co., Columbus, Ohio

TYPE OF: Building	Office Bldg.	Office Bldg.	Manufacturing	Light Manufacturing	Office Bldg.	Church	Hospital	Vocational School	Elementary School
Construction: frame	Reinf. Conc.	Steel	Steel	Struct Steel		Masonry	Conc. on B. J	Lt. Stl. & Curtain Walls	Steel & Brick
walls	Glass curt. wall	Window wall & block	Prot. metal & conc.	Brick & glass panel		Masonry & stone	Brick	Brick & Window Wall	Brick
Date construction started	April, 1957	1957	1956	June, 1958	June, 1956	June, 1958	May, 1958	March, 1958	Arpil, 1958
Location, city	Boston, Mass.	Seattle, Wash.	Seattle, Wash.	West Concord, Mass.	Houston, Tex.	Pittsburgh, Pa.	Elizabeth, Tenn.	Danielson, Conn.	Pittsburgh, Pa.
SIZE OF BUILDING:									
Height, stories	6	1	1	1	20	2	5	1	2
Floor area, sq ft	100,000 gross sf	318,600 sf	364,800 sf	24,000 sf	825,000 sf	4,400 sf	60,891 sf	80,000 sf	19,200 sf
Volume, cu ft		5,000,000 cf	16,000,000 cf	528,000 cf	11,900,000 cf	96,800 cf	684,955 cf	1,211,638 cf	252,500 cf
% air conditioned	85%	100%	0%	100%	100%	0%	25	0	0
RANGE OF COST of this type of building:	Gross cost			Min. / Avg. / Max.	Min. / Avg. / Max.	Avg.	Min. / Max.	Min. / Avg. / Max.	Min. / Avg. / Max.
Cost, $ per sq ft	$21.72			$7.50 / $15.07 / $22.00	$15.00 / $16.50 / $22.00	$28.90	$14.13 / $25.00	$10.50 / $16.00 / $22.50	$12.00 / $13.00 / $15.00
$ per cu ft				$0.68		$1.31	$1.26 / $2.22		0.95 / 1.00 / 1.30
Cost, per unit capacity							$7,823 / $13,836 bed		
ENR BUILDING COST INDEX (1913 = 100)	501	509	491	521	489	521	519	516	517

PRINCIPAL ITEMS OF COST	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%
Excavation & Site	46,696	2.21	97,000	2.28	225,000	4.74	38,000	10.49	82,000	0.68	10,000	7.86	27,526	3.20	113,300	7.10	13,100	5.28
Foundations	292,372	13.82	285,000	6.70	625,000	13.16	53,000	14.63	250,000	2.06	1,700	1.34	In struct frame		109,000	6.83	16,850	6.80
Structural Frame	319,789	15.11	277,000	6.52	920,000	19.37	43,000	11.87	2,600,000	21.40	6,909	5.43	175,471	20.39	68,000	4.26	27,300	11.01
Cement Finish Work	135,924	6.42	50,000	1.18	75,000	1.58	4,000	1.10			2,500	1.97	In struct frame		14,300	0.90	13,250	5.34
Exterior Masonry	In cmt fin work		78,000	1.84	23,600	0.50	22,000	6.07	320,000	2.63	36,000	28.31	92,770	10.78	44,300	2.78	31,100	12.55
Metal Wall Panels	133,183a	6.29	111,000	2.61	100,000d	2.11			2,000,000	16.46					4,600	0.29		
Interior Partitions	In masonry		108,000	2.54	24,500	0.52	8,000	2.21	500,000	4.11			In ext mnsry		134,000	8.40	9,300	3.75
Carpentry & Millwork	20,043	0.95	98,000	2.30	14,000	0.29	4,700	1.30			33,805	26.59	19,236	2.24	26,500	1.66	12,000	4.84
Sash & Glazing	25,840	1.22	14,000c	0.33	4,700	0.10	8,000	2.21			230	0.18	16,835	1.96	54,800	3.43	15,800	6.37
Doors	19,605	0.93	In millwork		53,000	1.12	1,000	0.28			In millwork				18,500	1.16	In millwork	
Roofing	34,735	1.64	178,000	4.19	93,000	1.96	8,300	2.29			6,000	4.72	14,346	1.67	39,000	2.44	6,700	2.70
Insulation	In roofing		In roofing				5,800	1.60					2,029	0.24				
Waterproof & Dampproof	15,459	0.73	–		In roofing		3,500	0.97			200	0.15	In roofing		5,150	0.32	1,700	0.69
Metal Lath, Fur & Plaster	65,338	3.09	62,000	1.46	5,900	0.10			1,100,000	9.05	11,000	8.65	54,058	6.28	12,700	0.80	20,800	8.39
Hollow Metal Work			19,000	0.45			5,800	1.60					11,116	1.29	13,200	0.83	3,100	1.25
Misc Iron & Ornament Metal	48,620	2.30	44,000	1.03	197,000	4.15	3,580	0.99					17,746	2.06	20,200	1.27	5,800	2.34
Tile, Terrazzo & Marble	22,181	1.05	4,700	0.11									31,080	3.61	6,570	0.41	1,500	0.61
Floor Covering	15,501	0.73	64,000	1.51			1,000	0.28			2,400	1.89	15,095	1.75	11,680	0.73	4,900	1.98
Painting	20,485	0.97	151,000	3.55	114,000	2.40	8,000	2.21			1,800	1.41	15,915	1.85	23,500	1.47	1,350	0.54
Finish Hardware	7,205	0.34	22,000	0.52	2,400	0.05					600	0.47	14,135	1.64	13,370	0.84	2,500	1.01
Acoustical Ceilings	34,983	1.65	230,000	5.41			3,800	1.05					8,755	1.02	11,690	0.73		
Plumbing	53,878b	2.55	157,000	3.69	123,000	2.59	9,630	2.66	2,500,000	20.57	4,685	3.68	209,504	24.35	126,520	7.93	10,000	4.03
Heat, Ventil & Air Condition	375,205	17.73	885,000	20.82	301,000	6.34	82,780	22.85	In plumbing		Reserved		In plumbing		168,100	10.54	29,000	11.70
Electric Wk & Fixtures	124,947	5.90	673,000	15.84	381,000	8.02	35,025	9.67	1,500,000	12.34	7,700	6.05	82,996	9.64	230,760	14.46	15,500	6.25
Elevators	112,500	5.32							1,300,000	10.70			Owner furnishes					
Moving Stairs																		
Special Service Equipment	163,570	7.73			540,000	11.37									104,110g	6.54g		
Power Plant			In Seattle Mfg Bldg		229,000	4.82	In heating								26,000h	1.63h		
Intercom Systems & Television			59,000	1.39	32,000	0.67					350	0.28	In electric		7,000	0.44	1,000	0.41
Sprinkler System	In plumbing		153,000	3.60	170,000	3.58	8,300	2.29										
Roof Deck			124,000	2.92											70,500i	4.42		
Tectum Deck					198,000	4.17												
Auditorium			43,000	1.01														
Installing Equipment							5,000e	1.38e										
Misc. Costs, not incl above	25,800	1.22	263,300	6.20	298,500	6.29												
Blackboards																	3,600	1.45
Landscaping & Walks											1,300	1.02					1,750	0.71
Venetian Blinds	2,250	0.10																
Casework, Cubicle Curtains, Toilet Part., Lockers, Dark Room Equipment, etc																		
Concrete floor & Slabs													51,923	6.03	117,900	7.39		
Total Cost	$2,116,210	100.0%	$4,250,000	100.0%	$4,750,000	100.0%	$362,215	100.0%	$12,152,000	100.0%	$127,179	100.0%	$860,546	100.0%	1,595,520	100.0%	$247,900	100.0%

a Glass b Incl sprinklers c Inc. aluminum doors d Prot. metal e Instal owner's equip, incl hookup f Metal g Inc. truck left in shop, garage equip., metal cabinets, Medart gym equip., gym seats, wood gym floors, kitchen equip, fire extinguishers, vault doors, chalk & tack boards, toilet accessories, etc h Mechanical work i Steel deck $21,500, insul rock $49,000



Sliding Sheave Type Clutch
Used on: G-34C
G-34-4C
G-42
G-46

EXCLUSIVE MANUAL CLUTCH MAKES STOW TROWEL TOP PERFORMER

Contractors and builders who have used them tell us that STOW Roto-Trowels do the fastest, most economical job on floating and finishing operations.

One big reason for this top performance is STOW'S exclusive manual clutch control which permits easier engine starts at *any* throttle setting, higher efficiency, less maintenance, faster and smoother finishing operations. The STOW Roto-Trowel is safer too, since the manual clutch automatically stops blade rotation within 1/6 second after the operator releases the handle, without stopping the engine!

Highly maneuverable, the STOW Roto-Trowel features a pitch control on the handle, so operator can change blade pitch easily, while the blades are in motion. Fixed guard ring permits working right up to walls and supports without danger.

STOW Roto-Trowels are available in 9 different models, ranging from 29" to 46" diameter, with 3-blade or 4-blade trowel assembly. For additional information contact your nearest STOW Distributor or write Stow Manufacturing Co., Binghamton, N. Y.

STOW Manufacturing Company
Dept. E-5, 19 Shear St.
Binghamton, New York

Please send me Concrete Equipment Catalog 580 and name of nearest distributor.

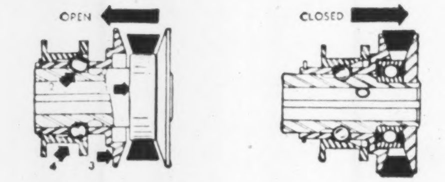
NAME ....

COMPANY ....

ADDRESS ....

CITY .... STATE ....

HOW IT WORKS



When the Clutch is disengaged, the sheaves of the pulley are open as shown. The belt rides slack on the outer race of a free running ball bearing.

To start trowel blades, the operator engages the clutch. The sliding sheave which is mounted on ball bearings is carried forward into the closed position. This forces the belt up off the bearing so that it grips the sidewalls of the pulley.

This smooth clutching eliminates grab, results in a slow, even start. With this clutch, belt life is increased since there are no belt stretching problems.

To stop the trowel, the operator lets go of the clutch control. Instantly, the belt pushes the sliding sheave back to the open position and rides free on the idler bearing.

STOW MANUFACTURING CO.

Dept. E-5, 19 Shear Street
Binghamton, New York

How Low Prices Ran on Wanapum Dam

While alternate bids on domestic and foreign generators featured the bidding for the Wanapum Dam on the Columbia River in Washington, all bids on both alternates were under the engineer's estimate (ENR May 21, p 21 and May 28, p. 100).

This is the second dam for the huge Priest Rapids hydro-electric project of the Grant County Public Utility District, Ephrata, Wash. Harza Engineering Co., Chicago, is the consultant.

Grant City Constructors, a joint venture of Morrison-Knudsen Co., Kaiser Engineering Div. of Henry J. Kaiser Co., Macco Corp., Raymond International, Inc., and F & S Construction Co., came in with the low bid of $88,879,411 on the foreign generator alternate, 35% below the engineer's estimate and almost $4,400,000 below their own bid on the domestic generator alternate. High bid of $107,937,223, on the foreign generator alternate, was 22% below the estimate.

The Z-shaped dam will be 8,320 ft long, 2,920 ft of which is reinforced concrete and 5,400 ft earth embankments. Maximum height from deepest point of excavation will be 185 ft. Spillway, 820 ft long, will have 12 Tainter gates 50x65 ft each. Powerhouse will be 1,540 ft long, base width 198 ft, with ten 120,000-HP, 85.7 rpm Kaplan turbines having a total capacity of 831,250 KW.

Construction is expected to commence in September and to be completed in five years.

The bidding included:

		For Gen. Alt.	Dom. Gen. Alt.
1	Grant County Constrs	$88 879 411a	$93 277 691
2	Northwest Dam Constrs	96 055 425b	97 279 342
5	Dixon-Arundel	107 937 223c	nb

a Jt. venture of Morrison-Knudsen, Kaiser Engr. Div. of Henry J. Kaiser Co., Macco Corp., Raymond International Inc., and F&S Constr. Co.

b Jt. venture of Peter Kiewit Sons, Midvalley Utility Constrs., Al Johnson Constr. Co., Condon-Cunningham Co., and Coker Constr. Co.

c Jt. venture of L. E. Dixon Co., Arundel Corp., Hunkin-Conkey Constr. Co., American Pipe & Constr. Co., and Guy F. Atkinson Co.

Dam, Powerhouse & Appurtenances

Bids: 5 15 59 Items	Unit	Quantity	Unit Prices 1	2
Move in	ls	job	$2,750,000	$2,750,000
Lab & field inspect off fac & util	ls	job	267,000	50,000
Cutoff wall				
exc, 50 or less	sf	191,000	2.60	4.50
over 50	sf	109,000	2.85	6.00
backfill	sf	284,000	1.10	0.30
conc surf under wat	cy	5,850	36.00	18.00
Seep cutoff, set up overgrt & check holes to be drilled	ea	320	51.00	110.00
Grout & check holes, drill through soil	lf	39,000	11.50	8.50
Conn to grt & check holes, seep cutoff	ea	12,800	11.00	6.00
Cement, grout in grtd cutoff pm&p	cf	51,000	$3.75	$1.15
Grout, silt	cy	1,650	41.20	20.00
clay	cy	150	41.20	60.00
Sleeve pipe	lf	12,800	2.60	3.50
Diversn & care water	ls	job	2,620,145	3,175,000
Exc, embankment	cy	500,000	0.70	0.30
spillway	cy	915,000	0.30	1.50
powerhouse	cy	1,400,000	0.80	2.00
tailrace	cy	2,915,000	0.30	0.45
approach channel	cy	3,900,000	0.35	0.45
Line drill & broach	sf	38,300	2.30	2.00
Rock fndn prep	sy	60,800	4.50	5.50
Set up overgrt, check or explor holes to be drilled	ea	1,000	21.20	8.00
Drill holes, AX	lf	24,000	3.80	2.50
BX	lf	7,100	5.10	3.50
NX	lf	16,000	7.25	4.00
Core recovery	lf	4,000	1.05	1.50
boxes	ea	200	8.50	6.00
Conn to drilled grt holes	ea	800	15.60	10.00
Anchor bar holes dr	lf	19,000	1.90	1.00
Cmt, fndn grout, pm&p	cf	17,000	2.35	2.60
Sand in grout	cy	150	81.50	10.00
Set up over anchor holes to be drilled	ea	120	115.00	100.00
Anchor hole drill	lf	5,760	43.40	50.00
cables & ftgs	lb	712,300	0.59	0.48
Cmt grt for cable anchors pm&p	cf	8,000	2.25	6.25
Sand, cable anch grt	cy	400	12.50	16.00
Anchor, pullout tests	ea	3	1,800	4,000
cables remov	lf	170	162.00	75.00
Fill, impervious	cy	590,000	1.10	0.50
pervious	cy	2,600,000	0.25	0.20
pl under water	cy	220,000	2.90	2.50
transition	cy	355,000	0.92	0.75
Filter matl	cy	108,000	0.88	1.50
Rockfill	cy	459,000	0.90	1.00
Compact, per pass	Msy	5,000	2.38	1.50
Slush grout	cy	300	33.00	15.00
Derrick stone	cy	7,000	3.95	7.00
Rockfill, other than embankment	cy	108,000	2.00	0.70
Riprap	cy	122,000	2.50	1.70
Base course	cy	6,700	3.40	2.80
Surface course	cy	2,600	6.50	2.50
Bituminous cement	t	230	95.00	30.00
Conc, spillway, mass	cy	185,000	9.50	8.50
deck & parapet	cy	635	34.00	26.00
grav dam, left abut retain & sim walls	cy	201,200	8.50	8.00
powerhouse	cy	578,500	11.00	10.00
fish passing fac	cy	123,800	10.00	10.00
spillway girders	ls	job	58,000	63,000
insulating	cf	2,000	3.00	2.50
miscellaneous	cy	100	62.00	25.00
Portland cement	bbl	1,005,200	4.69	5.00
Pozzolan	t	45,500	16.62	13.00
Forms, straight	sf	4,702,500	1.80	2.00
curved	sf	489,000	2.60	2.75
Stl, reinf & anch bar	lb	60,500,000	0.12	0.13
Wire fabric	lb	21,400	0.22	0.25
Jt seal & calk comp	lb	3,750	1.20	0.60
Bri seats, polyvinyl or neoprene rubber	lb	500	2.49	2.90
Coat for break bond	sf	468,300	0.12	0.09
Exp jt filler, preform				
bit type	lb	100	2.40	0.50
cork board	lb	14,150	0.36	0.70
rubber, spillw bri	lf	300	1.58	1.00
Contr jt strip, rubber	lf	5,800	1.90	1.75
Waterstop, type A	lf	8,150	1.90	3.50
type B	lf	100	3.40	12.50
type C	lf	134,150	1.18	1.60
type C	lf	19,500	1.70	3.00
Floor hardner, colorls	sf	42,600	0.10	0.06
colored	sf	4,000	0.20	0.15
Finish, nonslip floor	sf	16,000	0.50	0.40
abrasive resist	sf	25,200	0.75	0.60
Bit cement filler	cy	5	77.00	185.00
Steel, struct	lb	67,000	0.26	0.25
joists	lb	421,000	0.20	0.25
Track rail & access	lb	967,500	0.21	0.25
Galv sheet metal	lb	96,800	0.60	0.70
CI frames, covers & gratings	lb	91,500	0.43	0.50
Log bm cables & ftgs	lf	10,300	0.70	0.70
Alum beam guard rail	lb	32,000	1.65	1.15
pipe railing	lb	47,000	2.20	3.00
parapet railing	lb	21,900	1.90	1.70
plate trench covers & frames	lb	38,200	1.60	1.80
Misc metalwork	lb	2,246,000	0.43	0.55
Future unit bulkheadg	ls	job	31,381	65,000
Fish fac metalwk	lb	1,110,000	0.20	0.38
alum diffusion gratg	lb	290,300	1.40	1.40
Trash boom, float logs	fbm	160,000	0.30	0.15
other work	fbm	57,500	0.40	0.30
Timberwk, aux fish fac	fbm	233,000	$0.30	$0.35
Concrete block, 4"	sf	9,200	0.90	1.40
8"	sf	1,100	1.25	1.65
Structural tile,				
6" unglazed	sf	500	2.90	3.50
6" glazed	sf	1,750	6.30	3.70
4" glazed	sf	1,125	5.40	3.20
Glazed tile soaps, 2"	sf	600	4.10	2.70
Cer wall tile	sf	1,880	2.80	3.30
Wood paneling	sf	810	1.20	1.50
Alum foil insulation	sf	2,100	0.18	0.60
Plasterboard	sf	5,320	0.20	0.30
Partitions, met lath & plaster	sf	1,740	0.40	6.00
movable office, met	sf	1,150	5.50	6.00
Panels, porcelain alum sandwich	sf	21,400	6.20	4.80
aluminum	sf	1,860	6.10	3.30
Rubber floor tile	sf	2,400	1.13	0.50
base, 6"	lf	280	0.80	0.40
Vinyl floor tile	sf	4,520	1.20	0.50
base, 6"	lf	370	0.90	0.50
Quarry tile floor	sf	44,200	2.52	2.00
base, 6"	lf	1,920	2.50	1.00
Terrazzo floor, incl divider strips	sf	1,225	1.68	2.00
6" base, incl divider	lf	210	1.30	1.30
Steel subfloor	sf	4,170	2.10	1.70
Roof, incl stl deck, insul, vapor barrier built-up roofg & copper metalwork	sf	82,700	2.08	1.85
Roof scuttle	ls	job	281.00	120.00
Accoust tile ceiling, incl accessories	sf	5,320	2.25	1.90
Perf pan ceiling, incl accessories	sf	3,050	2.24	2.00
Cmt asb board, ceiling	sf	1,200	2.23	2.50
Deck insul, incl adhes	sf	28,200	0.90	1.00
Lumber	fbm	9,000	0.45	0.70
Alum doors	sf	366	23.50	16.00
& glass doors	sf	164	22.00	17.00
Access panels	ea	17	47.00	30.00
Doors, hollow metal	sf	1,088	11.50	10.00
metal clad fire	sf	565	16.60	15.00
sliding	sf	1,120	16.85	15.00
vertical lift	sf	288	28.00	14.00
wood	sf	581	10.00	5.00
dutch	ea	1	280.00	250.00
Alum window wall units, incl glazing	sf	2,030	13.70	15.00
Mirrors & glass shelv	ea	12	57.00	50.00
Steel shelves	ls	job	225.00	275.00
Metal lockers	ls	job	1,767	1,800
Benches	ls	job	225.00	400.00
Signs	lb	200	5.50	3.50
Flag pole	ls	job	780.00	950.00
Toilet stalls	ls	job	1,583	1,600
Shower stall, pan, cop	lb	24	12.00	7.50
CIP, soil, ex heavy hub & spigot	lb	18,300	0.50	0.34
mechanical joint	lb	164,000	0.40	0.21
B&S flanged	lb	20,000	0.30	0.61
Steel pipe				
und 4", blk or galv	lb	102,000	0.70	0.59
pickled & oiled	lb	18,500	0.70	0.76
4 12", black or galv	lb	488,000	0.50	0.472
pickled & oiled	lb	34,800	0.60	0.41
14 24" black or galv.	lb	341,000	0.50	0.541
30" & over, blk or galv	lb	215,000	0.40	0.27
Stl-pipe fittings, 30" & over	lb	53,500	0.60	0.75
Stl pipe, black, 30" diffuser	lb	5,000	0.60	0.71
Stl flanges, lt wgt, 30 72", drilled & tap	lb	52,000	0.50	1.95
Cor metal pipe	lb	282,000	0.30	0.156
Flexible metal hose	lb	50	3.30	9.60
Acid resistant pipe.	lb	1,500	0.90	0.42
Cop tubing, seamless, hard & soft, tp K&L	lb	3,200	4.00	3.06
Brass pipe, std IPS	lb	2,700	3.00	0.77
Asbestos pipe	lb	100	0.40	0.46
Valves, flanged,				
CI, 6" & under	lb	12,000	0.90	0.71
over 6"	lb	88,000	0.70	0.68
stl flap, over 6"	lb	1,600	1.90	1.66
semi-stl, check,				
6" & under	lb	500	0.90	0.96
over 6"	lb	17,000	0.80	0.80
plug, lubricated				
6" & under	lb	1,000	1.20	1.01
over 6"	lb	9,500	0.80	0.87
plug, non-lubricated,				
4" & under	lb	50	1.40	1.12
over 4"	lb	48,200	0.90	1.33

(Continued on page 100)

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Precision-Matched Instruments
Koh-I-Noor offers draftsmen an important new concept—a comprehensive line of instruments and accessories meticulously matched to achieve a new high in professional performance.
ADAPTO-CLUTCH LEAD HOLDER and EJECTOMATIC LEAD DISPENSER
Two Koh-I-Noor products designed to work together for greater convenience. Lead holder's non-slip clutch takes all 17 degrees of Koh-I-Noor lead. Ejectomatic Dispenser feeds lead to holder without need to touch it.
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A smoothly performing ruling, lettering and tracing pen that uses India or regular ink with equal facility. A tremendously convenient, time-saving, reliable instrument. Fully guaranteed. In five precision line widths:
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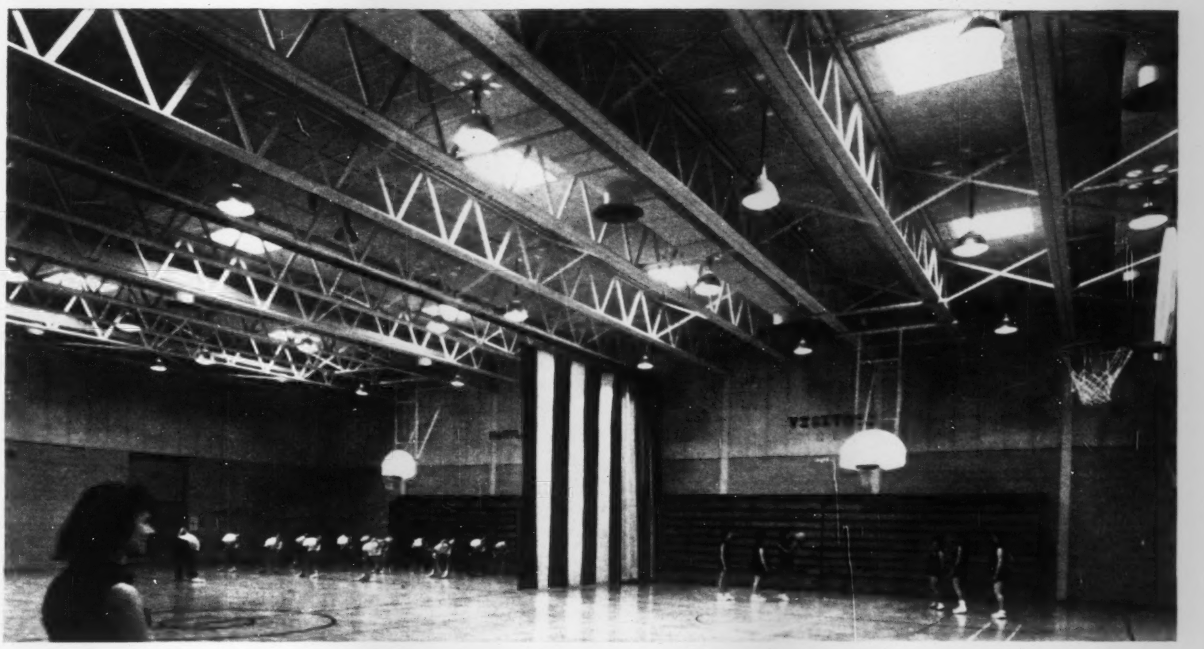
#0 EXTRA-FINE #2 MEDIUM
Write for descriptive literature.
by KOH-I-NOOR of course
Bloomsbury 3, New Jersey

. . . Wanapum Dam

Bids: 5-15-59 Items	Unit	Quantity	Unit Prices 1	Unit Prices 2
Fl, roof & gut drains	lb	6,200	$1.20	$1.03
Valves, screw or flgd, brs or brz, globe, angle, relief, check & pressure reducing	lb	2,500	3.10	1.83
solder joint	lb	60	5.00	6.20
solenoid, under 2"	lb	30	7.00	7.50
2-6"	lb	750	4.00	2.82
butterfly, 12" or less	lb	500	1.00	2.20
CI pressure reducing under 6"	lb	250	1.00	1.99
6-12"	lb	2,600	0.85	1.47
pinch type	lb	100	1.12	2.87
Floor stands, vlv ext stems & adj guide brackets	lb	650	2.16	1.54
Vlvs motor oper	lb	5,400	2.10	3.13
pneu oper, 4-8"	lb	300	2.20	2.75
10-24"	lb	6,600	1.90	2.46
1½-4"	lb	100	2.51	6.29
Pipe hangers & supp	lb	21,000	0.99	1.97
Steel tanks	lb	92,500	0.32	0.27
Air receivers	lb	193,600	0.48	0.30
Water clos, vit china	ea	12	135.00	214.00
Urinals, vit china	ea	8	144.00	179.00
Lav, CI, white enamel	ea	9	110.00	133.00
built-in type	ea	1	114.00	100.00
Serv sinks, CI, acid resist, enam inside	ea	4	167.00	176.00
Showers, concealed tp	ea	1	199.00	178.00
Chrome toil pap hold	ea	12	17.00	14.00
liquid soap dispens	ea	10	32.50	20.00
soap dishes	ea	5	13.00	13.00
cabinet, pap towel	ea	10	194.00	30.00
Drink fntn, mech refrn	ea	7	318.00	264.00
Surgical sink, vit ch	ea	1	135.00	106.00
Kitch unit, comb sink, elec range refrigerator & overhead cab	ea	1	995.00	1,040
Elec wat htr, 66 gal	ea	2	273.00	204.00
8 gal	ea	2	273.00	163.00
Air comp & access, draft tube water depression	ls	job	40,600	32,415
station service	ls	job	14,060	20,047
350 psi	ls	job	2,990	5,950
Water treatment plt	ls	job	14,060	12,710
Fire Protects systs generator	ls	job	52,600	49,250
oil stor & purif rms	ls	job	12,320	15,200
port. & wall hung equip	ls	job	4,140	5,234
transformer	ls	job	107,210	52,305
Fire detect syst, pumphouse	ls	job	8,073	3,785
Oil purifi equip	ls	job	13,297	19,000
Raw water filters	ls	job	5,231	13,600
Control center	ls	job	4,652	3,400
Pneu sewage ejector	ea	1	1,982	1,971
Strainers, Y-pattern	lb	10	2.00	4.80
twin basket	lb	2,500	0.75	2.25
inlet, brs or brz	lb	30	3.10	1.70
Inlet bar grat, stl	lb	3,300	0.50	0.67
perf plates, stl	lb	6,500	0.52	0.67
Gauge glasses & press gauges	lb	350	7.00	15.60
Headw & tailw record transm & remote indicator	ls	job	3,853	3,780
Exp jts, packless type	lb	2,100	1.10	3.64
packing type	lb	550	1.40	6.40
Sleeve coupl, Dresser	lb	19,600	0.80	1.00
Air traps, automatic	lb	50	3.50	1.20
Float switches	ea	2	90.00	201.00
Flowmeter turbine	ea	10	1,400	2,570
Totalizing meter, oil service	ea	2	633.00	250.00
Septic tank chlorina	ea	1	680.00	1,069
Rubber hose	lf	100	0.50	0.71
Ductwork	lb	56,000	0.85	1.02
Plenums & asso metal work	lb	9,200	0.85	0.72
Registers & grills, 1 sf & less	sf	50	1.70	38.50
over 1 sf	sf	250	1.40	21.50
Ceiling diffusers	sf	60	13.50	82.00
Insul-concealed air conditioning ducts	sf	4,100	1.13	0.95
Insul ducts & equip in vent houses	sf	3,600	1.13	2.54
Duct lining	sf	1,200	$0.56	$0.76
Elevators	ls	job	79,384	85,000
Diesel elec gener unit, standby	ls	job	57,680	72,500
Turbines i	ls	job	951,981	831,500
Governors i	ls	job	50,000	75,000
Spiral case pressure piezometer plates, for future units i	ea	12	33.00	500.00
Deep well turb type pumps & access i	lb	47,200	0.13	0.19
Centri wat & sewage pumps & access i	lb	6,100	0.17	0.23
Positive displace rotary or screw tp pumps & access i	lb	1,600	0.17	0.25
Turbine driven pumps & access i	lb	400,000	0.15	0.07
Butterfly valves, 30-48" & access i	lb	84,200	0.14	0.45
54-96" & access i	lb	46,000	0.13	0.35
Free disch vlv & access (Howell-Bunger) i	lb	24,000	$0.08	$0.18
Mach shop equip & crane i	lb	90,000	0.19	0.04
Pumphouse crane i	lb	20,000	0.08	0.07
Centri & vanezxial fans, power roof ventila & access i	lb	29,500	1.41	0.16
Air washers, access i	lb	26,600	1.13	0.15
Filters & access i	sf	550	1.14	4.50
Elec htrs & access i	lb	7,700	1.13	0.55
Louvers & access i	sf	1,000	1.52	4.73
Air condition units humidif & access i	lb	5,500	0.85	0.27
Contr ctrs & panel boards i	lb	33,000	0.23	0.12
Misc mech equip, wgt less than 10 each i	lb	150	0.20	1.50
10-50 each i	lb	300	0.18	0.48
50-150 each i	lb	750	0.17	0.26
150-500 each i	lb	1,500	0.15	0.18
500-2000 each i	lb	3,000	0.14	0.15
2000 & over, ea. i	lb	16,000	0.14	0.12
Outlet boxes & cov, cast ferrous	lb	6,000	1.63	4.69
sheet steel	lb	5,500	1.74	3.11
Rigid steel conduit ½"	lf	4,300	1.01	0.72
¾"	lf	45,000	1.12	0.88
1"	lf	10,000	1.53	1.16
1¼"	lf	15,000	1.74	1.63
1½"	lf	25,000	1.95	1.96
2"	lf	35,000	2.49	2.50
2½"	lf	5,000	3.65	3.71
3"	lf	5,000	4.39	[illegible]
3½"	lf	7,000	5.06	5.92
4"	lf	4,000	5.73	7.59
5"	lf	500	6.39	10.90
Flexible conduit ¾" steel	lf	250	1.12	1.80
liq tight	lf	200	1.69	3.00
1" liq tight	lf	100	1.96	5.49
1¼" steel	lf	150	1.64	4.60
liq tight	lf	100	2.19	6.62
1½" steel	lf	100	2.52	7.32
liq tight	lf	50	3.08	8.20
2" steel	lf	50	2.82	8.60
liq tight	lf	50	3.36	12.60
Non-metallic conduit tp I, 2"	lf	50,000	1.23	0.95
4"	lf	25,000	1.53	1.22
tp II, 4"	lf	3,000	1.52	1.20
Metal non-magnetic conduit, 1½"	lf	1,500	2.81	5.75
2"	lf	1,000	3.36	6.44
2½"	lf	500	4.50	9.30
600V insul wire, 12	lf	100,000	0.11	0.16
10	lf	35,000	0.12	0.13
8	lf	13,000	0.16	0.19
6	lf	6,000	0.29	0.22
4	lf	12,000	0.36	0.29
2	lf	15,000	0.45	0.38
1/0	lf	5,500	0.73	0.60
2/0	lf	6,500	0.91	0.70
4/0	lf	25,000	1.23	0.99
500 MCM	lf	14,000	2.53	1.95
750 MCM	lf	6,000	3.57	2.60
Cable, armored, 15 kv 3 c-4	lf	2,000	4.82	5.16
non-armored, 15 kv VCLC, 3 c-4	lf	1,500	4.70	6.40
rub insul, 3 c-4	lf	1,500	4.48	6.00
VCLC, 3 c-2	lf	5,000	5.60	6.08
rub insul, 3 c-2	lf	5,000	4.70	6.40
1 c-4	lf	500	5.17	4.22
1 c-2	lf	15,000	2.80	1.93
600 V contr cable, 1 c-19 25	lf	3,000	0.23	0.15
2 c-19 25	lf	25,000	0.28	0.35
3 c-19 25	lf	12,500	0.40	0.51
4 c-19 25	lf	10,000	0.45	0.65
5 c-19 25	lf	20,000	0.56	0.73
7 c-19 25	lf	25,000	0.67	0.88
9 c-19 25	lf	15,000	0.85	1.11
12 c-19 25	lf	10,000	1.13	1.38
1 c-19 22	lf	5,000	0.23	0.19
2 c-19 22	lf	9,000	0.28	0.48
3 c-19 22	lf	10,000	0.40	0.51
4 c-19 22	lf	10,000	0.62	0.72
5 c-19 22	lf	1,500	0.85	0.97
7 c-19 22	lf	5,000	1.13	1.14
4 c-16	lf	5,000	0.56	0.30
7 c-16	lf	5,000	1.13	0.37
17 c-16	lf	25,000	1.41	0.84
32 c-16	lf	7,000	3.40	1.56
600 V parkway cable, 3 c-10	lf	3,000	0.45	0.67
2	lf	6,000	3.94	1.39
1/0	lf	1,000	4.50	2.09
Tel wire, rub insul, twisted pair	lf	3,000	0.50	0.16
cable, polythylene insul, 11 pairs	lf	5,000	2.13	0.45
16 pairs	lf	5,000	2.81	0.50
Fixture wire	lf	2,000	0.28	0.22
Cable racks, trays & supt, 12" wide	lf	2,000	6.02	4.22
18" wide	lf	20,000	6.38	5.11
24" wide	lf	8,000	7.47	6.05

(Continued on p. 104)



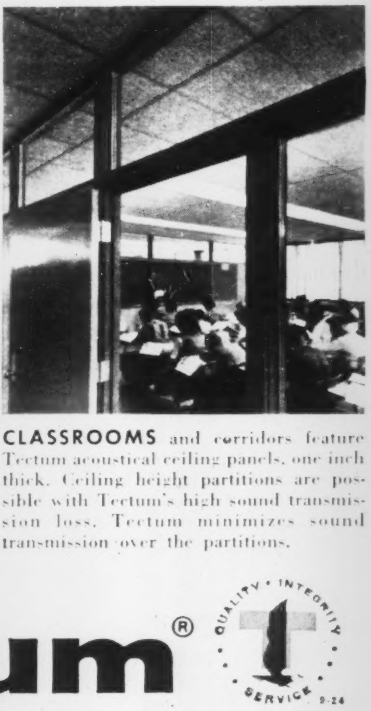
GYMNASIUM incorporates both Tectum roof deck and sidewall panels for maximum insulating and acoustical value. Roof deck is 2½" thick; sidewall panels are 2" thick with neat beveled edges and tongue and groove joints. *Four walls and a ceiling for effective sound control* in an area where noise can be a problem during study periods.

Sound Control Emphasized In New Michigan School

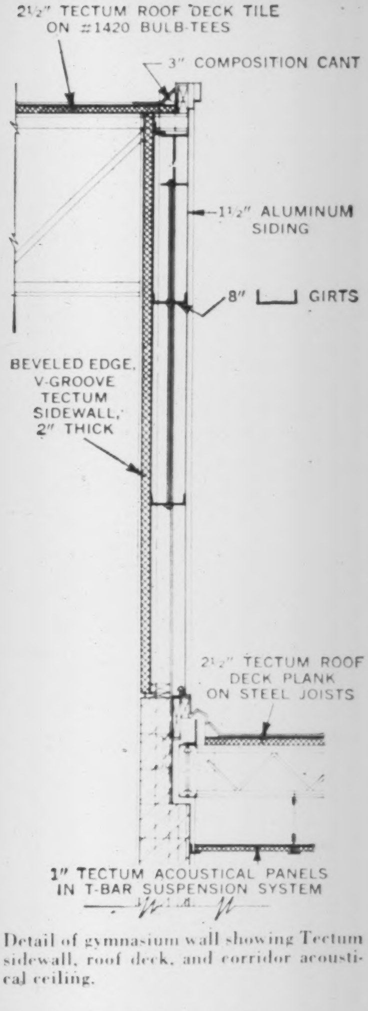
Noncombustible Tectum wood fiber products are ideal for big-building roof decks, sidewalls and acoustical ceilings. Tectum is structural, insulating, acoustical and has natural good looks that architects and contractors can recommend. These products are erected with minimum time and labor.

For complete information, see your nearest Tectum representative, who offers complete planning service, or write Tectum Corporation, Newark, Ohio. Plants in Newark and Arkadelphia, Arkansas. Regional offices in Atlanta, Philadelphia, Columbus, Chicago, Dallas, Beverly Hills, Seattle and Toronto, Canada. Competent distributors in all leading areas.

Hartland (Mich.) High School • Architect: Charles W. Lane & Assoc., Ann Arbor, Mich. • *Contractor:* Wallace Constr. Co., Farmington, Mich.



CLASSROOMS and corridors feature Tectum acoustical ceiling panels, one inch thick. Ceiling height partitions are possible with Tectum's high sound transmission loss. Tectum minimizes sound transmission over the partitions.

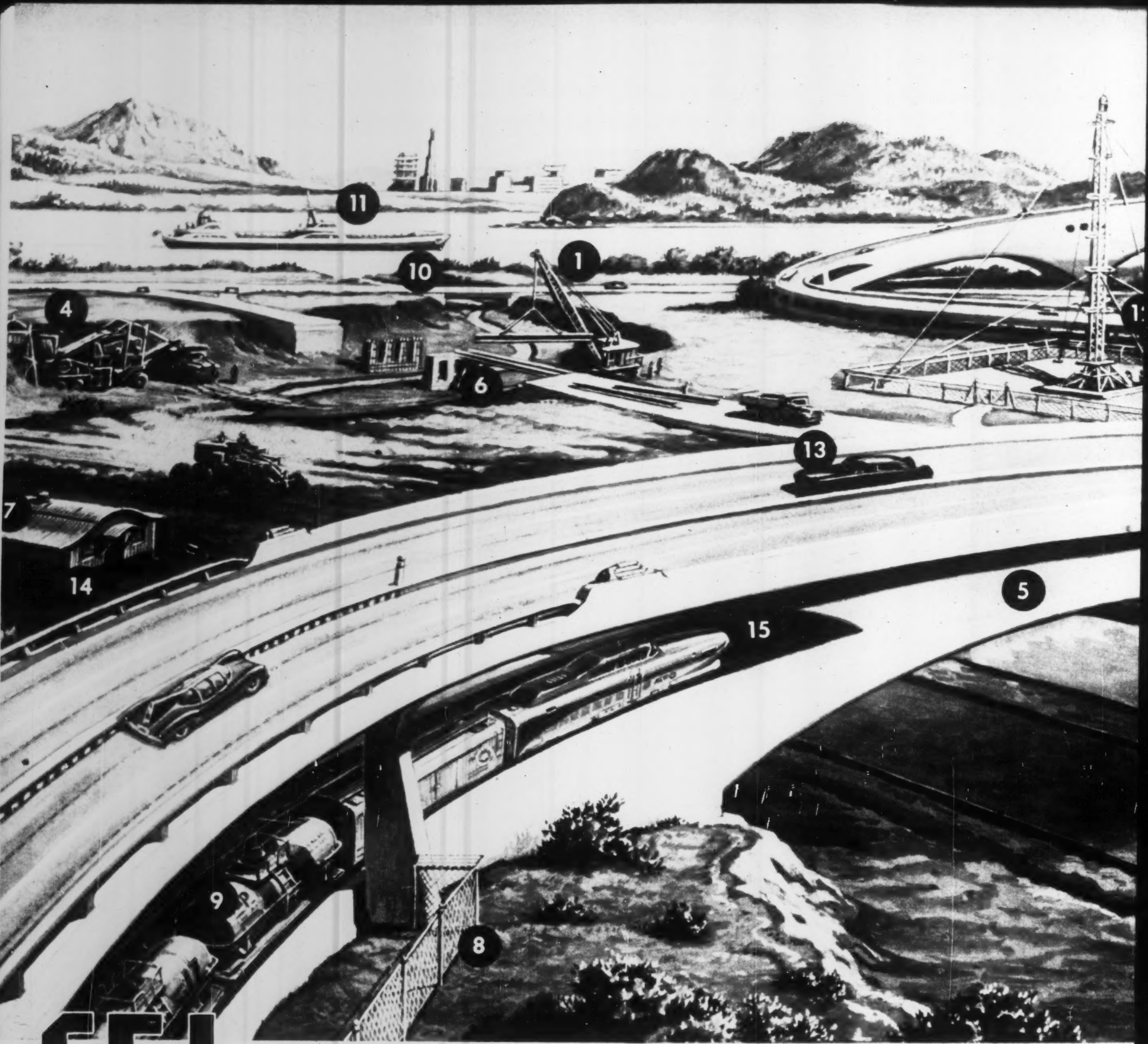

2½" TECTUM ROOF DECK TILE ON #1420 BULB-TEES
3" COMPOSITION CANT
1½" ALUMINUM SIDING
8" ⊔ GIRTS
BEVELED EDGE, V-GROOVE TECTUM SIDEWALL, 2" THICK
2½" TECTUM ROOF DECK PLANK ON STEEL JOISTS
1" TECTUM ACOUSTICAL PANELS IN T-BAR SUSPENSION SYSTEM

Detail of gymnasium wall showing Tectum sidewall, roof deck, and corridor acoustical ceiling.

Tectum®

QUALITY • INTEGRITY • SERVICE

9-24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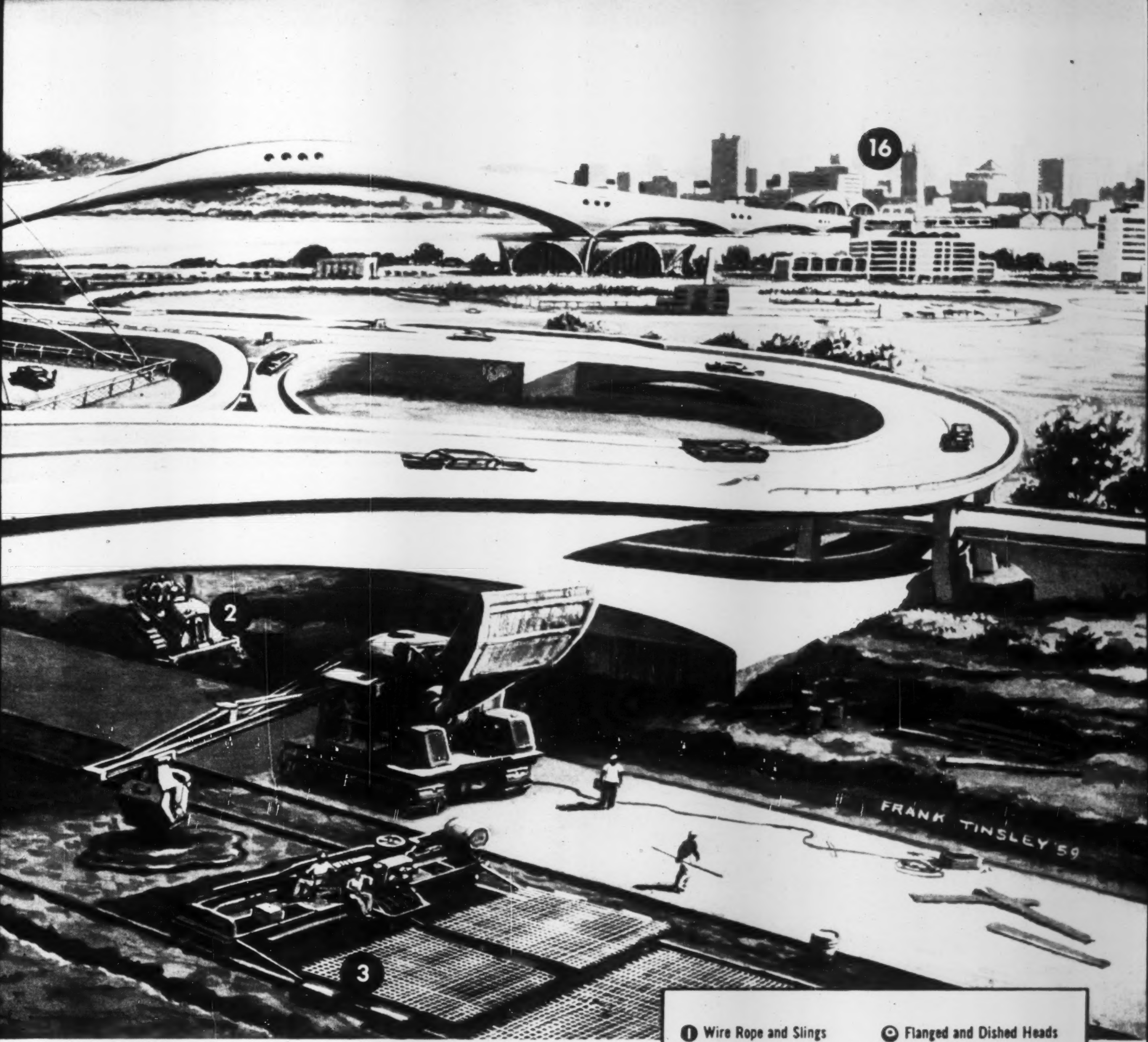
CIRCLE L-3 READER SERVICE CARD



Steel, the backbone of today's economy, must play an even greater role in the future growth of our nation.

In this construction scene of a not too distant tomorrow, CF&I's continually improved steel products are at work just as they are today. Each one bears the stamp of quality—each is used with confidence by construction men. These steel products are the reward of constant research and almost a century of steel-making experience.

In the Construction Industry—as in so many other industries—CF&I's modern steel products keep pace with progress. The result: not only the making and selling of good steel and steel products, but the servicing of all industries.

① Wire Rope and Slings
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⑤ Reinforcing Bars and Tie Wire
⑥ Prestressed Concrete Strand and Wire
⑦ Nails and Spikes
⑧ Chain Link Fence
⑨ Flanged and Dished Heads
⑩ Welded Steel Girders
⑪ Carbon and Alloy Steel Plate
⑫ Galvanized Steel Strand
⑬ Springs
⑭ Insect Wire Screening
⑮ Rails, Spikes, Track Bolts and Tie Plates
⑯ Elevator Cable

6867

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San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita
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Spray deep penetrating, colorless Thompson's Water Seal on fresh concrete to cure and seal in one operation. Save time . . . save labor.

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- Produces harder, dust-free surface.
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Send for technical bulletin and Contractors Case History file.

A proved bond breaker for pre-cast, tilt up and lift slab construction. Permits easy, clean separation of slabs, walls, pre-cast members.

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E. A. Thompson Co., Inc., Merchandise Mart, San Francisco 3, California

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. . . Wanapum Dam

Bids: 5 15 59

Items	Unt	Quantity	Unit Prices 1	Unit Prices 2
Power outlets, 600 V 3 phase, flush mtd	ea	30	$45.00	$84.50
surf mtd	ea	50	45.00	74.80
Ground conductors	lb	100,000	1.57	0.94
rods	lf	2,000	2.09	2.82
Safe switch, unfused, 3 PST, 600 V, 30A, NEMA encl 1A	ea	10	44.00	3.70
7	ea	2	45.00	114.00
60A, 1A	ea	20	45.00	57.00
Non-auto circ breaker 3 pole, 600 V, 100A, NEMA encl 1A	ea	5	170.00	112.00
225A, 1A	ea	3	170.00	236.00
400A, 1A	ea	2	450.00	376.00
600A, 1A	ea	1	450.00	519.00
100A, 4	ea	3	169.00	186.00
225A, 4	ea	2	169.00	346.00
400A, 4	ea	1	450.00	732.00
600A, 4	ea	2	450.00	838.00
Comb line starter, 600 V, 3 pole, NEMA size 1	ea	5	101.00	295.00
2	ea	3	147.00	423.00
3	ea	1	214.00	660.00
4	ea	1	416.00	1,098
Pushbutton station	ea	10	11.00	28.30
Select switch, 3 posi	ea	10	11.30	24.50
Tel & code call syst, compl exc tel stations & code call signal devices	ls	job	6,750	9,460
desk type	ea	9	61.00	39.00
rt of way	ea	2	113.00	115.00
wall type	ea	38	50.00	51.50
outdoor type	ea	8	113.00	125.00
receptacle, indoor	ea	120	17.00	6.00
outdoor	ea	30	17.00	11.50
Code call, 4" gong	ea	2	28.00	21.00
6" gong	ea	21	34.00	24.00
Musical, sft tone gong	ea	1	28.00	20.00
Vibr elec horn dbl projector, weatherprf	ea	5	96.00	156.00
Wall clock, 24"	ea	2	310.00	267.00
12"	ea	10	180.00	37.50
Clock reset control	ea	1	562.00	39.00
Generators i	ea	10	120,000	94,150
Transformers i	lb	2,000,000	0.007	0.027
cooling system i	lb	115,000	0.17	0.13
Generator circ brkr switchgear, 14.4 kv i	ea	10	3,370	1,230
surge protect & potential transformer cubicle i	ea	10	1,685	255.00
Reactor cubicle, incl transi sects i	ea	2	1,685	354.00
Air compress assem, incl stor tank i	ea	3	394.00	372.00
Compressed air piping system i	lf	1,000	5.62	1.09
Serv sta switchgear cub, 13.8 kv i	ea	12	2,810	438.00
Isolat phase buses i	lf	1,000	7.88	58.10
Generator grndg cub i	ea	10	675.00	488.00
600 V indoor unit substa transformer section i	ea	8	2,700	1,090
cubicle, transf breaker i	ea	8	480.00	261.00
bus tie breaker i	ea	4	480.00	261.00
feeder brkr i	ea	16	480.00	251.00
600 KV outdoor unit substa transf sect i	ea	2	2,700	771.00
cub, transf brkr i	ea	2	480.00	418.00
bus tie brkr i	ea	1	480.00	404.00
feeder brkr i	ea	4	480.00	337.00
Sta serv motor contr center cubicle for sta auxiliary i	ea	60	337.00	326.00
fish facilities i	ea	20	480.00	338.00
serv 600 V load ctr distri panelboard i	ea	10	428.00	257.00
Main contr duplex benchboard sect i	ea	15	737.00	353.00
Sta serv duplex switchbrd sect i	ea	6	730.00	389.00
Recorder brd panel i	ea	10	337.00	289.00
Wat lev, spillw gate & fish contr panel i	ea	4	225.00	285.00
Unit auxiliary switchboard panel i	ea	40	366.00	337.00
Ltg transf, 1.5 kva i	ea	33	45.00	40.00
10 kva, dry type i	ea	2	96.00	118.00
oil filled type i	ea	2	141.00	97.00
15 kva, dry type i	ea	8	113.00	115.00
oil filled type i	ea	2	158.00	115.00
25 kva, dry type i	ea	17	141.00	151.00
Indoor ltg panelboard 2-wire, 600V i	ea	6	113.00	52.00
125V i	ea	14	113.00	45.00
3-wire, 120 240V, with 2-2P branch breaker & 8-SP	ea	23	281.00	68.00
12-SP i	ea	22	281.00	96.00
16-SP i	ea	7	281.00	110.00
Outdr ltg panelboard 3-wire, 120 240V, with 2-2P branch breaker & 8-SP i	ea	2	281.00	80.00
12-SP i	ea	4	280.00	101.00
Auto transf switch, 100A i	ea	5	90.00	74.00

Bids: 5-15-59

Items	Unit	Quantity	Unit Prices 1	Unit Prices 2
Automatic transf switch 200A i	ea	5	$90.00	$123.00
600A i	ea	1	146.00	200.00
Photoelec ltg contr i	ea	12	56.00	73.00
Lighting fixtures fluores, recessed i	ea	86	27.00	37.00
suspended i	ea	27	28.00	39.00
incandesc, recessed i	ea	84	17.00	22.50
glassteel diffuser i	ea	300	22.00	11.00
dome reflector i	ea	400	17.00	11.00
decor opalescent i	ea	60	28.00	13.50
vaportight, surface mounted i	ea	500	27.00	8.30
recessed i	ea	35	28.00	8.00
outdoor, recessed i	ea	350	28.00	14.50
vaportight handrail mounted i	ea	20	17.00	16.00
exit i	ea	10	17.00	11.00
highbay i	ea	100	56.00	42.70
beamlite i	ea	10	22.00	16.00
decor luminaire i	ea	10	23.00	17.50
road ltg, brack mtd i	ea	40	34.00	38.00
Lighting standard i	ea	40	56.00	108.00
fixture, substation, bracket mounted	ea	20	17.00	30.70
pole mounted i	ea	10	23.00	116.00
outdoor island i	ea	20	34.00	30.00
aviation obstruct i	ea	6	34.00	28.00
Floodlight, weatherproof i	ea	100	34.00	18.00
Ltg switch & cover i	ea	170	6.00	3.00
Receptacle & cover, 2-wire, 125V i	ea	375	6.00	3.00
250V i	ea	50	3.00	3.00
3-wire, 250V i	ea	3	3.00	5.00
Floor receptacle, 2-wire, 125V I	ea	5	6.00	12.00
Clock receptacle, 3-wire, 125V i	ea	12	4.00	4.00
Storage batteries i	lb	30,000	0.05	0.06
Motor generator & inverter sets i	ea	3	300.00	276.00
Feed rail, 100A i	lf	150	18.00	9.00
Induct volt regulat i	ea	6	450.00	272.00
Spare parts for Dist-furn equip, handle, transport & store i	lb	22,000	0.05	0.06
Paint inter walls insul ductwk & piping i	sf	58,300	0.07	0.15
Stl, pulloff struct 230 kv erect	lb	615,000	0.17	0.08
Elec equip, pull-off struct A, B, C i	ls	job	2,401	22,000

Tubines & Governors

Items	Unit	Quantity	Unit Prices 1	Unit Prices 2
10 Kaplan turb, 120,000 HP, 85.7 rmp w foreign generat f	ls	*job	10,187,000	9,936,000
w domestic gen f	ls	*job	nb	9,740,000
Price adjustment, turb, extr for furn spiral casepresspiezometer plate, 6 future units	ls	**job	1,200	1,450
total for 10 turb, chge in shft.lgth per lf	lf	***	22,200	24,170
per lf of in. ⌀	lf		1,050	3,198
Gov equip compl w aux for 10 turbs w foreign generat f	ls	job	913,100	x931,460
escalation			19,000	34,930
w domestic gen f	ls	job	nb	xx873,020
escalation				32,738

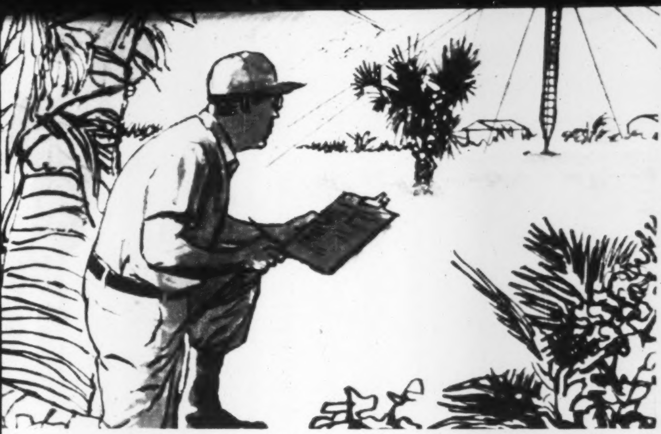
Generators

Items	Unit	Quantity	Unit Prices 1	Unit Prices 2
10 gen & appurt, 87,500 kva, foreign f	ls	****job	10,511,500	13,984,000
alt dom f	ls	****job	14,669,907	14,300,000
Price adj, gen shaft per lf change in length, total for 10 gen, for	lf	***	21,000	24,170
alt dom	lf	***	35,000	35,000
per lf of in. ⌀	lf			
for alt	lf		3,000	3,750
dom alt	lf		2,000	2,000
Escalation foreign alt			750,000	
domestic alt			980,250	1,168,800

Cranes

Items	Unit	Quantity	Unit Prices 1	Unit Prices 2
Gantry crane, 1 emer, excl feed rail f&i	ls	job	332,200	390,485
spare parts	ls	**job	260.00	600.00
Buklh gantry crane, 1, excl feed rail, trashrake & rake follower f&i	ls	job	115,200	152,659
trashrake & rake follower f&i	ls	**job	10,500	13,039
spare parts	ls	**job	260.00	600.00
Powerhse cranes, 2, excl feed rail f&i	ls	job	576,308	652,584
price adj per ton, for change in capacity total for 2 cranes	t	job	1,000	1,000
per ft change in span length total 2 cranes	t	job	1,250	1,250
main hoist lift, total 2 cranes	lf	job	500.00	500.00
spare parts	ls	**job	425.00	700.00

(Continued on p. 106)



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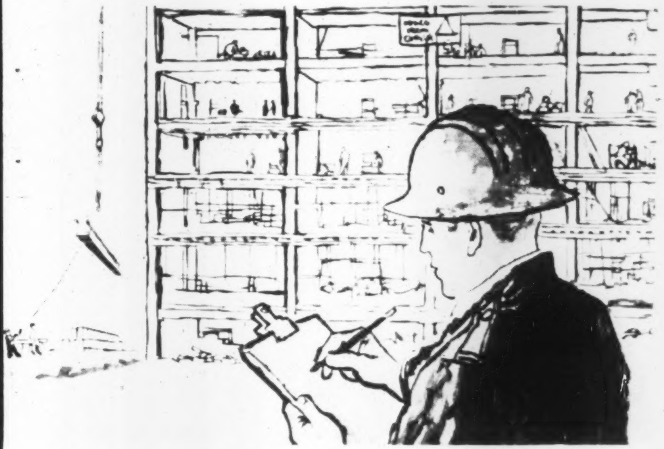
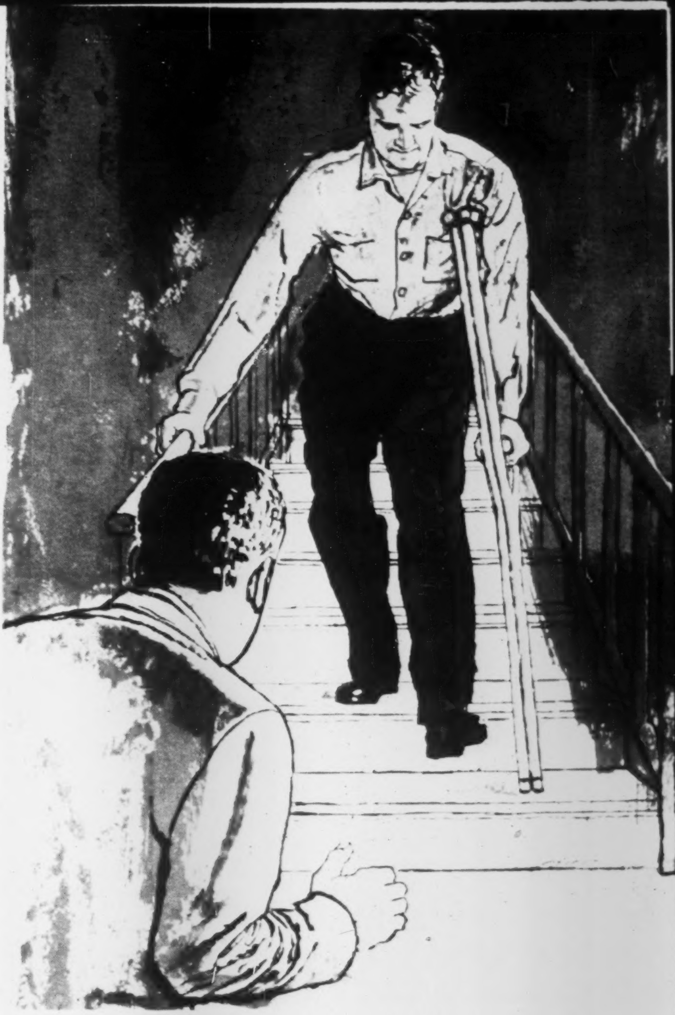


Spot-checking for hazards. Because he is briefed on every phase of your operation in advance, your Liberty construction safety engineer knows just where to look for accident hazards. By helping you control loss, he helps you keep your compensation costs down.



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to safeguard your people ... to cut workmen's compensation insurance costs

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This is Liberty's protection in depth. On this page are pictured some of the services behind it. All these services are backed by the dollars and experience of the largest writer of compensation insurance.

Over the years, protection in depth has helped Liberty policyholders save money two ways: through reduced compensation rates and through more than $491 million in dividends returned since 1912.

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CIRCLE L-7 READER SERVICE CARD

. . . Wanapum Dam

Bids: 5-15-59 Items	Unit	Quantity	Unit Prices 1	Unit Prices 2
Draft tube gantry crane, excl feed rail f&i	ls	job	$92,500	$104,463
spare parts	ls	**job	264.00	600.00
Feed rails for cranes,				
emer gantry f&i	lf	1,540	20.50	35.00
bulkhd gantry f&i	lf	1,740	15.00	18.50
powerhouse f&i	lf	1,000	20.50	32.80
draft tube gant f&i	lf	1,000	15.50	19.15

Gates & Trashracks

Items	Unit	Quantity	Unit Prices 1	Unit Prices 2
Spillway gates & hoists, 12 f&i	ls	job	2,610,500	2,252,497
Intake bulkhead,				
36 sections f&i	ls	job	391,750	370,703
48 frame & guide sets, incl dogging device f&i	ls	job	255,000	347,015
Intake wheel				
4 gates f&i	ls	job	227,290	289,875
48 fr & gd sets, incl dog dev f&i	ls	job	560,560	774,563
Draft tube				
6 gates f&i	ls	job	103,125	102,020
30 fr & gd sets incl dog dev f&i	ls	job	162,840	176,986
Intake trashrack				
180 sections f&i	ls	job	268,230	307,178
48 fr & gds f&i	ls	job	300,575	350,360
Wheel gate carriage, compl w scafford & gate hanger f&i	ea	1	30,930	38,202
Trash sluice gate & & hoist equip f&i	ea	1	42,200	72,656
Fish fac, telesc orif entr, gates & gds, 2-leaf,				
22 sets steel f&i	ls	job	191,490	391,343
alt alum f&i	ls	job	267,490	xx
weir gates & gds, 3-leaf,				
3 sets steel f&I	ls	job	52,330	70,518
alt. alum f&I	ls	job	70,530	xx
Performance bond	ls	job	544,752	613,000

*Compl. less gov equip. Shaft alignment is or is not included

**Purchase to be at option of the District

***Fractional ft will be prorated at this price

****Shaft alignment is or is not included

x English Elec. xx Dominion Engr.

f Furnish f&i Furnish & instal i Instal

pm&p Process, mix & place

•

Tennessee Highway Prices

Average Unit Prices Bid on Selected Items, 1957-8

Item	Unit	No. of Proj. 1957	No. of Proj. 1958	Unit Prices 1957	Unit Prices 1958
Exc, road & drainage	cy	134	152	$0.47	$0.45
channel, uncl	cy	60	70	0.77	0.64
Water embankment	Mgal	129	152	2.32	2.13
Borrow exc, common	cy	103	106	0.60	0.52
uncl	cy	90	94	0.52	0.45
Ditches & shoulders	mi	64	90	353.34	311.55
Traf bound grav or chert surf rdwy	cy	53	46	2.06	2.29
Cr stn bit conc base, min aggregate	t	52	53	5.46	5.89
asph cement	t	51	54	32.06	34.36
Bit matl, prime coat	t	108	116	44.89	44.43
Hot bituminous seal coat					
bituminous material	t	68	98	35.91	38.93
min aggregate	t	68	98	3.18	3.55
Single bit surf treatment					
bituminous material	t	78	93	36.64	41.12
Asph conc surf course					
min aggregate	t	69	76	6.13	6.51
asph cement	t	69	76	32.47	34.06
tack coat	t	65	72	39.36	43.41
Conc, cl A	cy	112	131	57.84	56.75
bridge	cy	84	92	60.91	59.56
Steel bar reinf	lb	111	130	0.14	0.14
bridge	lb	82	93	0.14	0.13
Conc pipe culv, 18"	lf	109	111	4.35	4.05
24"	lf	101	111	5.96	5.57
30"	lf	93	90	8.14	8.20
36"	lf	66	83	10.30	10.38
CMP culv, 15"	lf	107	86	3.31	3.91
18"	lf	92	100	3.94	4.82
24"	lf	58	74	6.04	5.87
arch culv, 18x11"	lf	64	110	3.58	3.81
22x13"	lf	50	91	4.15	4.52
Markers	ea	68	113	6.89	6.84
Concrete curb	cy	16	17	51.46	58.24
comb curb & gutter	cy	20	15	42.31	40.85
Rubble stn riprap, plain	cy	59	45	15.42	17.45
Water (B&R)	Mgal	19	4	3.35	3.00
Alum handrail, 2 rail	lf	6	5	9.00	8.74
Blading & rolling	lm	28	6	192.00	157.51
Existing pave remov	sy	28	35	1.00	1.47
MH frames & covers, adjust existing	ea	7		64.62	
Seeding	unit	36	12	2.57	7.50

(*Unit Prices continued on p. 108*)

thanks to
XEROGRAPHY...

Robert Harding, right, assistant chief engineer of Arma division, American Bosch Arma Corporation, points out to Frank McShane, cost-improvement expert, the high quality and contrast of an 11" x 17" stock print reduced from an original 22" x 34" drawing. The print is a sample of many run off on an offset duplicator from an inexpensive offset paper master prepared xerographically by XeroX Model 1218 copying equipment.

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- *engineering drawings*
- *drawing-change notices*
- *specifications sheets*
- *parts lists*

Arma Division, American Bosch Arma Corporation, is saving $82,000 a year in the rapid reproduction of engineering drawings, drawing-change notices, specification sheets, and parts lists. Arma manufactures midget brains for missiles and other intricate electronic devices.

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remote controlled

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CIRCLE L-9 READER SERVICE CARD

Bid Price Trends in Wisconsin

Highway contract price trends for selected items show variations over four year period

tems		Unit	Average Unit Prices 1955	1956	1957	1958
Clear		sta	$38.77	$43.23	$41.34	$43.98
		ac	212.68	196.68	258.59	170.12
Grub		sta	28.12	43.48	40.94	44.41
Conc pavement, rural	r	sy	0.54	0.58	0.53	0.48
urban	r	sy	1.10	0.94	0.80	0.78
Curb	r	lf	0.29	0.33	0.49	0.456
& gutter	r	lf	0.44	0.47	0.41	0.31
Conc sidewalk	r	sy	0.95	0.80	0.68	0.74
Excavation, common		cy	0.56	0.41	0.32	0.29
rock		cy	0.81	0.96	0.64	0.85
marsh		cy	0.28	0.36	0.28	0.256
uncl, rural		cy	0.41	0.42	0.36	0.352
urban.		cy	0.53	0.53	0.73	0.63
struct, bridges		cy	8.21	7.26	6.53	4.505
culverts		cy	4.21	4.91	4.24	3.68
Borrow exc, rural		cy	0.51	0.51	0.47	0.43
urban		cy		1.15	0.52	1.00
Old road, obliterate		sta	21.99	24.24	22.69	20.93
Subbase, granular		cy	0.82	0.76	0.57	0.58
Conc base course, 7"		sy	3.60	3.37	3.87	4.73
8"		sy	3.29	4.19	4.27	3.72
9"		sy	4.11	5.42	4.43	4.27
Base course, gravel		cy	1.24	1.71	1.64	1.58
		t	1.01	1.19	0.99	1.01
cr stone		cy	1.94	2.36	2.14	1.988
		t	1.50	1.55	1.47	1.4[illegible]
traf bound		cy	1.70	1.67	1.44	1.86
Conc pave, 9" rural		sy	3.42	3.67	3.35	3.32
urban		sy	4.50	4.40	4.37	3.87
10"		sy		4.95	5.78	4.00
reinforcement		sy		0.56	0.56	0.56
Bit surf, prep for roadbed		sta	7.21	7.23	5.70	7.32
matl for prime coat		gal	0.16	0.18	0.18	0.18
surf crse, rural		t	28.07	32.09	32.90	30.75
surf plt mix, single agg, rural		t	3.67	4.45	3.84	4.56
urban		t	5.75	5.83	6.19	10.03
conc pave, rural		t	4.10	4.81	4.07	4.71
urban		t	7.24	7.73	7.18	5.87
Conc masonry, bri, rural		cy	56.10	64.95	63.25	54.64
urban		cy	58.20	64.98	63.00	48.29
culv, rural		cy	54.57	61.48	57.09	56.28
Stl, bar reinf, bri		lb	0.11	0.13	0.12	0.117
culv		lb	0.12	0.13	0.13	0.124
Stl, struct carbon		lb	0.19	0.21	0.22	0.16
Sheet lead		lb	0.58	0.66	0.55	0.434
zinc		lb	0.75	0.80	0.73	0.795
Lumber & timber, treated		Mbm	488.97	479.15	497.29	394.62
Masonry mortar rubble		cy	26.87	29.69	30.00	28.69
Culvert pipe, 18"		lf	3.52	3.59	3.64	3.57
24"		lf	5.01	5.46	5.54	5.61
30"		lf	6.60	6.84	7.14	7.28
36"		lf	9.86	10.56	10.81	11.23
42"		lf	11.75	12.94	14.66	13.57
48"		lf	14.45	14.56	16.55	16.47
54"		lf	16.49	20.32	18.67	21.46
60"		lf	23.09	25.12	25.33	26.00
72"		lf	30.46	31.36	31.81	31.98
RC culv pipe, 18"		lf	3.52	3.59	4.06	3.53
24"		lf	5.01	5.46	6.17	5.84
30"		lf	6.60	6.84	8.42	8.58
36"		lf	9.86	10.56	11.94	12.19
42"		lf	11.75	12.94	15.36	14.82
48"		lf	14.45	14.56	19.24	16.87
60"		lf	23.09	25.12	29.86	28.48
72"		lf	30.46	31.36	35.35	....

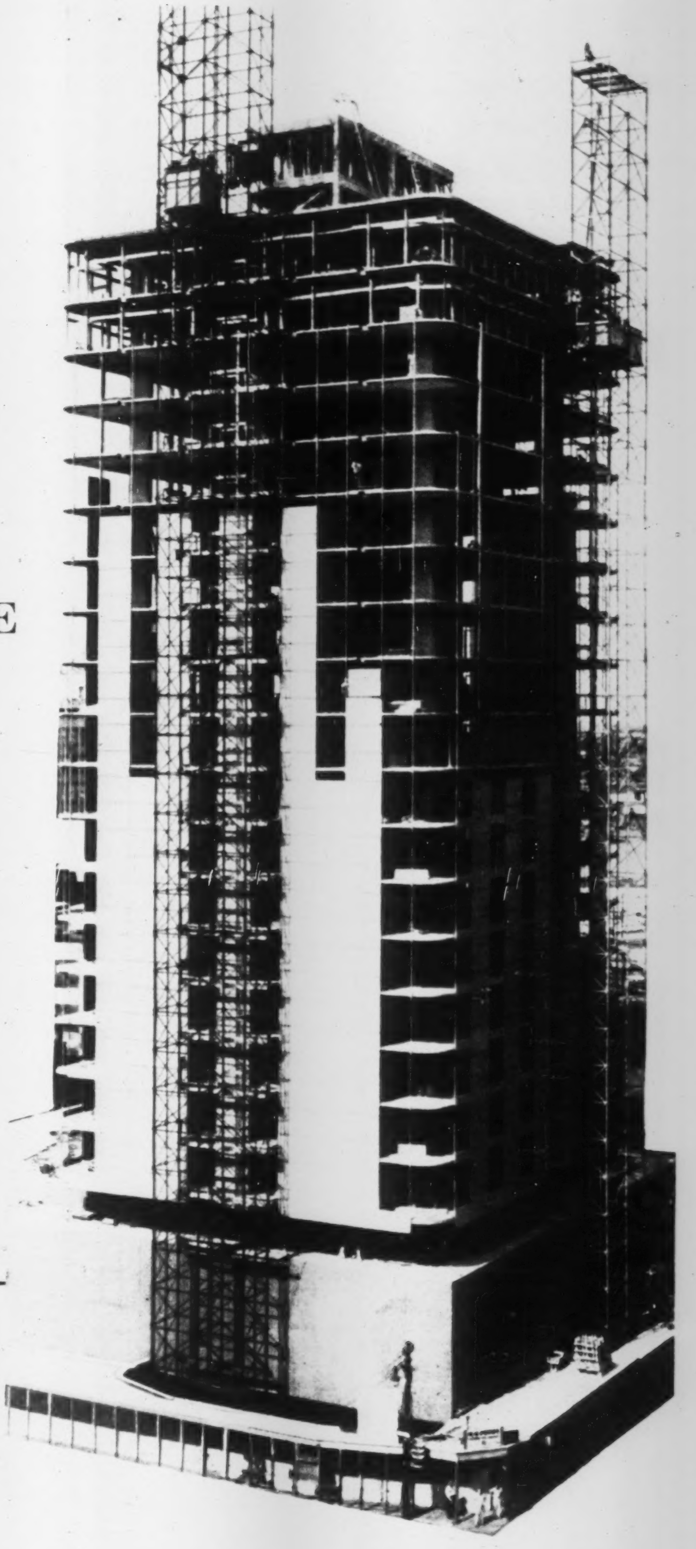
Items		Unit	Average Unit Prices 1955	1956	1957	1958
Corr galv sht met culv pipe, 18"		lf	$3.72	$3.85	$3.80	$3.78
24"		lf	5.48	5.84	5.86	5.64
30"		lf	7.27	7.32	8.00	7.49
36"		lf	9.41	11.95	11.46	11.89
42"		lf		13.27	16.84	16.16
48"		lf	13.00	15.00	16.00	18.54
60"		lf		32.00	25.00	28.80
72"		lf	29.50	31.00	30.34	33.39
CMP arch, 18"x11"		lf		4.50	4.59	3.50
22"x13"		lf	4.84	4.49	6.63	4.02
25"x16"		lf		4.98	5.23	4.91
29"x18"		lf	6.19	6.87	7.13	6.45
36"x22"		lf	7.91	9.25	8.34	8.47
43"x27"		lf	12.24	12.36	12.32	11.27
50"x31"		lf	14.42	14.09	13.52	14.59
58"x36"		lf	16.51	15.73	16.95	17.72
65"x40"		lf	20.97	22.60	21.47	21.84
72"x44"		lf	27.78	24.33	27.46	30.54
Pipe cattle pass, 72"		lf	28.38	31.32	31.50	32.61
Struct pl pipe arch, 8'		lf	62.37	50.92	43.48	57.40
9'		lf	56.42	60.38	60.00	
10'		lf	62.62	68.86	60.00	78.73
11'		lf	80.00	60.00	75.00	77.11
12'		lf	67.34	71.58	80.00	100.55
13'		lf	78.26		120.00	77.00
14'		lf		75.00	80.00	107.99
15'		lf	88.50		86.25	127.24
Piles, untr timb	del	lf	1.43	1.70	1.81	1.49
	dr	lf	0.56	0.55	0.71	0.45
treated timb	del	lf	2.04	2.36	2.42	2.44
	dr	lf	0.73	0.59	0.55	0.37
shoes, pipe		ea	8.70	8.20	7.75	6.86
steel	del	lf	4.48	5.88	3.80	3.83
	dr	lf	0.95	1.05	0.93	0.885
conc, cip	del	lf	6.75	6.60	7.02	7.06
	dr	lf	1.20	1.84	1.24	1.54
Galv stl conduit, 3"		lf	2.00	2.47	2.72	2.80
Fiber duct, 3"		lf	1.84	2.[illegible]	2.17	2.63
Floor drains		ea	36.89	45.54	47.30	29.58
Pipe rail w pipe posts		lf	7.42	8.75	9.30	8.52
Riprap		cy	10.82	11.37	10.46	10.10
heavy		cy	7.26	8.16	7.31	7.90
grouted		cy	23.42	19.64	33.83	
Slope pave, grtd rubble		sy	4.97	5.54	5.63	5.32
Pipe underdrain, 6"		lf	2.59	2.17	1.77	3.38
8"		lf	3.00	3.24	3.21	3.53
12"		lf		4.65	4.19	3.33
RCCP storm sew, 12"		lf	6.63	5.88	6.38	3.55
15"		lf	5.81	5.88	6.39	4.84
18"		lf	6.65	6.66	10.00	4.98
24"		lf	5.48	5.84	11.22	7.42
30"		lf	10.81	11.12	15.31	11.70
Conc curb type J		lf	1.45	1.90	1.87	2.36
& gutter, 30"		lf	2.25	2.40	2.46	2.31
sidewalk 5"		sf	0.46	0.49	0.45	0.47
Gd fence, cable		lf	1.89	2.10	1.94	1.79
anchors for		ea	47.78	54.65	57.01	59.99
stl plate beam		lf	2.55	2.88	2.81	2.45
Marker posts		ea	4.95	5.03	4.87	4.86
Surf treat, CaCl		t	48.79	54.00	52.07	51.99
Topsoil		sy	0.20	0.16	0.17	0.164
salvaged		sy	0.11	0.10	0.10	0.084
Straw mulch		sy	0.05	0.05	0.05	0.048
Fertilizer		cwt	4.64	4.59	5.17	5.02
Seeding		sy	0.016	0.016	0.016	0.016
Sodding		sy	0.65	0.70	0.55	0.55

Highway Price Trends, New Hampshire

Weighted average unit prices on selected items, 1954-1958

Items		Unit	Unit Prices 1954 a	1955 a	1956 a	1957 b	1958 b High	Low	Avg.
Earthwork & Roadway									
Clear & grub		ac	$430.58	$453.15	$	$495.49	$800.00	$80.00	$453.75
Trees, small	remov	ea	31.21	33.61	31.08	37.22	60.00	19.00	32.40
large	remov	ea	61.68	68.74	76.40	99.80	125.00	50.00	70.82
Excavation, earth		cy	0.53	0.54	0.55	0.53	1.20	0.30	0.45
incl borrow		cy	0.50	0.50	0.65	0.68	1.20	0.35	0.40
ledge		cy	2.37	2.51	2.38	2.19	4.00	0.43	2.83
uncl		cy	0.78	0.85	0.83	1.89	2.00	0.29	0.62
muck		cy	0.45	0.50	0.49	0.48	0.55	0.30	0.40
uncl channel		cy	0.61	0.55	1.46	0.74	7.00	0.35	0.61
struct, earth		cy	5.00	....		4.53	6.00	2.18	3.83
ledge		cy	13.00	....		10.67	15.00	10.00	11.42
uncl		cy	3.24	4.81	5.03	3.73	50.00	1.00	2.74
Borrow, earth		cy	0.50	0.49	0.44	0.45	1.25	0.30	0.48
sand		cy	0.90	....	0.60	0.59	1.00	0.35	0.58
Gravel		cy	0.80	0.79	0.75	0.80	2.00	0.16	0.72
backfill		cy	1.89	1.93	1.61	2.10	6.00	0.25	1.30
overhaul		cym	0.06	0.01	0.06	0.04	0.10	0.00	0.05
Crushed gravel		cy	2.02	2.28	1.84	1.64	2.00	1.10	1.47

(New Hampshire Hwy Prices continued p. 110)



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Denver, Colorado

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Structural Engineer: Seelye, Stevenson, Value & Knecht, New York City
General Contractor: N. G. Petry Construction Company, Denver, Colorado

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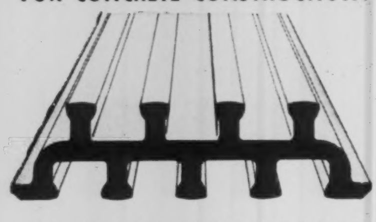

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. . . Highway Price Trends, New Hampshire

(Earthwork & Roadway—Contd.)

Items	Unit	Unit Prices						
		1954 a	1955 a	1956 a	1957 b	1958 b		
						High	Low	Agv.
Asph surface treatment, cl A	gal	$0.20	$0.19	$0.22	$0.21	$0.70	$0.00	$0.18
Tar surface treatment, cl A	gal		0.26	0.27	0.28	0.32	0.25	0.29
Hot asph concrete pavement, tp I-1	t	8.26	7.88	8.44	7.87	35.00	5.22	6.80
base, tp I-1	t				7.77	7.50	6.25	7.03
wearing crse, tp I-1	t	19.75	18.09	19.26	16.64	35.00	7.00	11.59

Structures

Items	Unit	1954 a	1955 a	1956 a	1957 b	1958 b High	1958 b Low	1958 b Agv.
Concrete, cl A	cy	55.28	58.92	58.40	53.35	100.00	30.00	50.53
footings	cy				28.59	38.52	24.00	31.07
approach slab	cy				27.01	31.00	23.00	26.82
cl B	cy	33.88	56.52			70.00c	41.70c	44.96c
cl C	cy	52.76	46.09	61.63	48.92	53.50	27.00	33.23
cl D	cy	50.00	45.00		75.17	28.00	28.00	28.00
cl AA	cy				63.35	75.00	54.00	66.00
Steel, reinf	lb	0.13	0.13	0.14	0.13	0.50	0.12	0.13
struct	lb.	0.15	0.13					
Masonry, mortor squared stone	cy				239.06	280.20	215.00	242.60
mortar rubble	cy	36.52	36.31	39.79	41.62	50.00	30.00	41.46
Stone coping	lf				10.23	13.00	8.00	10.11
Reinf conc pipe, std strength, 15"	lf	3.23	3.22		4.22	6.00d	3.33d	4.13d
18"	lf	4.09	4.08		5.21	5.50d	4.15d	4.96d
24"	lf	5.90	5.96		7.46	10.00d	6.00d	7.11d
30"	lf	8.20	8.80		9.62	10.50d	7.70d	8.97d
36"	lf	10.78	10.64		11.58	13.00d	10.00d	11.55d
ext strength, 24"	lf	7.41	7.39		8.70	9.50e	4.80e	7.86e
30"	lf	7.40	11.87		10.14	13.50e	9.00e	10.26e
36"	lf	42.89	13.06		13.89	13.00e	11.00e	11.64e
42"	lf	15.00			18.29	15.50e	15.50e	15.50e
dbl ext strength, 15"	lf	4.55	4.18		5.39	4.50f	4.50f	4.50f
18"	lf				6.55	7.00	5.50f	6.03f
30"	lf	11.00	11.00		11.87	12.00f	9.75f	10.57f
36"	lf	14.00			13.39			
48"	lf				23.93	21.00f	21.00f	21.00f
Reinf conc pipe, lay 15"	lf	1.08	1.46		1.64	5.50	1.50	2.35
18"	lf	1.43	1.75		3.04	3.00	2.00	2.33
24"	lf	2.00	2.51		4.07	5.00	2.00	3.62
48"	lf	5.00	6.75		6.81	10.00	6.00	8.00
Steel service water pipe, 4"	lf				3.70	4.00	4.00	4.00
Concrete sewer pipe, 12"	lf	2.45	1.96		3.25	5.00	2.50	3.74
Reinf concrete sewer pipe, 15"	lf	3.03	3.37		4.35	5.50	5.50	5.50
Cor met pipe, bit ctd, 15"	lf	3.56	3.78		4.73	5.50	4.50	4.82
18"	lf		4.14		6.42	7.00	5.00	6.13
24"	lf	4.50	6.00		7.78	9.50	6.00	8.53
30"	lf		9.16		10.58	15.00	9.15	11.97
42"	lf				18.39	18.00	18.00	18.00
10 ga, 48"	lf				24.01	24.00	20.00	21.73
10 ga, 54"	lf		.....	.....	29.17	28.00	28.00	28.00
10 ga, 60"	lf	.....	.....	.....	32.92	35.19	28.50	33.01

Other Construction

Items	Unit	1954 a	1955 a	1956 a	1957 b	1958 b High	1958 b Low	1958 b Agv.
Bearing piles, conc	lf				6.20	6.50	6.00	6.11
steel	lb	0.14	0.965	0.14	0.11	0.16	0.10	0.11
Pile load test	ea	100.00	615.38	626.09	688.89	2,500.00	400.00	710.64
Bridge rail, E	lf	12.07	8.10	13.90	14.80	17.25	6.50	13.97
Membrane waterproofing	sy	2.65	2.42	2.32	2.09	3.00	1.50	2.05
Riprap, E	cy	17.15	15.54	24.24	24.70	30.00	15.00	25.17
Stone fill	cy	3.32	4.39	2.49	4.72	25.00	1.00	4.11
Underdrain, RCP, 15"	lf	3.34	3.92		5.08	5.25	4.10	4.53
18"	lf				6.05	6.50	5.00	5.66
perf CMP, bit ctd, 6"	lf	1.83	2.00		2.63	3.30	1.75	2.56
12"	lf	3.06	3.08		4.00	5.00	3.60	4.34
15"	lf	3.63	3.49		4.55	6.00	4.00	5.19
Granite curb, C, straight	lf	3.32	2.93	2.32	2.12	2.90	1.75	2.08
curved	lf	5.33	7.71	7.47	8.59	12.00	3.40	5.21
straight, bridge	lf	4.21	4.59	4.39	4.68	6.00	4.00	4.34
Asphalt concrete curb	lf		0.68	0.70	0.88	1.25	0.58	0.95
Guard rail, cable, std GR-1A	lf	1.50	1.53	1.58	1.64	2.00	1.35	1.45
multi-cable, std GR-2A	lf	1.92	1.76	1.89	2.11	2.90	1.75	2.00
wood, single rail, GR-3A	lf	3.42	3.05	3.17	3.68	5.00	2.50	3.17
beam, GR-6B	lf		3.39g	3.37g	3.58	4.00	3.10	3.40
Anchorages	ea	37.86	38.62	40.64	47.77	60.00	38.00	48.45
Post markers	ea	7.34	6.84	6.87	7.66	10.00	5.00	7.19
Catch basin, B	ea	174.71	178.27		219.71	300.00	160.00	210.36
C	ea	173.56	176.86		203.31	250.00	190.00	207.15
Drop inlet, type C	ea	166.78	173.01		198.98	220.00	190.00	201.47
Manhole	ea	183.33	204.00		237.50	300.00	220.00	264.00
Sluice, half circ, 15" std	lf			4.33	4.88	5.00	4.50	4.59
18" std	lf			4.62	6.98	7.00	4.75	5.25
Inlets, granite curb, type B	ea	32.77	37.66	35.32	33.77	45.00	27.00	32.61
Curb board	lf	0.34	0.31	0.37	0.42	0.50	0.34	0.39
Pipe sleeve, 4"	lf	1.05	1.31		1.45	3.00	1.20	1.91
Asphalt sidewalk, 2"	t				22.68	20.00	10.00	15.44
2"	sy	2.54	2.07	2.38				
gutter	sy		3.35	3.71	5.24	10.00	3.00	3.44
sluice	sy		3.68		4.50	10.00	3.00	4.16
Concrete sidewalk, 4"	sy	4.79	4.46		5.82	6.00	4.50	4.93
Fence, stock wire	lf	0.38	0.36		0.61	0.75	0.46	0.52
gate	ea				46.37	50.00	35.00	44.33
Project markers	ea	22.90	23.07		23.82	50.00	15.00	23.00
Loam, 4" deep	sy	0.42	0.40		0.37	2.00	0.30	0.38
Sod	sy	1.79	2.18		1.77	5.00	1.25	1.74
Fertilizer	lb	0.12	0.10		0.09	0.20	0.05	0.12
Grass seed	lb	1.67	1.90		1.84	5.00	1.50	1.99
Mulch	t				64.69	85.00	50.00	67.93
Calcium chloride	t	63.37	61.11		60.70	100.00	50.00	58.80
Water	unit	3.21	2.51		2.25	3.00	0.10	1.93
Bounds, furnish & set	ea	13.68	15.41		19.87	25.00	14.00	17.07
Cutback asphalt for pretreatment	gal				0.32	0.40	0.05	0.25
with antistrip agent	gal		0.23		0.28	0.50	0.19	0.30
Seal coat for shoulders, aggregate	t		6.31		6.16	7.00	5.50	6.23
cutback asphalt	gal		0.19		0.20	0.20	0.17	0.17

•a Turnpike projects excluded. •b Interstate projects included. •c Footings. •d Class III. •e Class IV. •f Class VI. •g GR-6A.

(*Unit Prices continued p. 115*)

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157

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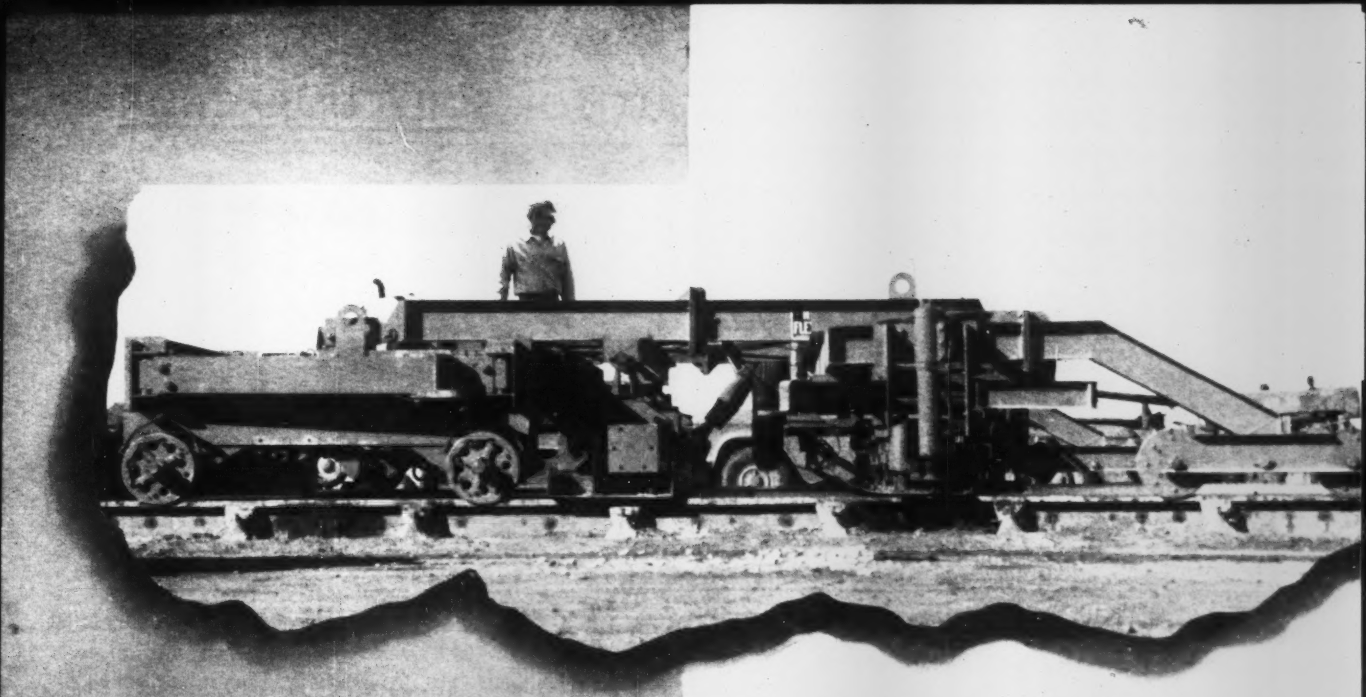

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It's the greatest advance in concrete finishing in a decade—Flex-Plane's revolutionary new Gas-Electric Finisher-Float machine that gives you substantially increased power and infinite control of both machine and screed speed, regardless of grade or concrete slump!

This means you can now set both machine and screed speed independently—quickly and easily adjust machine to achieve desired results.

What's more the new Finisher-Float is the most versatile machine marketed today. The finisher frame extends from 12′ to 26′, permitting finishing of everything from full width slabs to ramps and approaches. The finisher section is quickly detached from the float trailer for use on narrower width slab—eliminating the need for a second finisher. Both screeds and float pan are equipped with new extra quick, precision crown change mechanisms.

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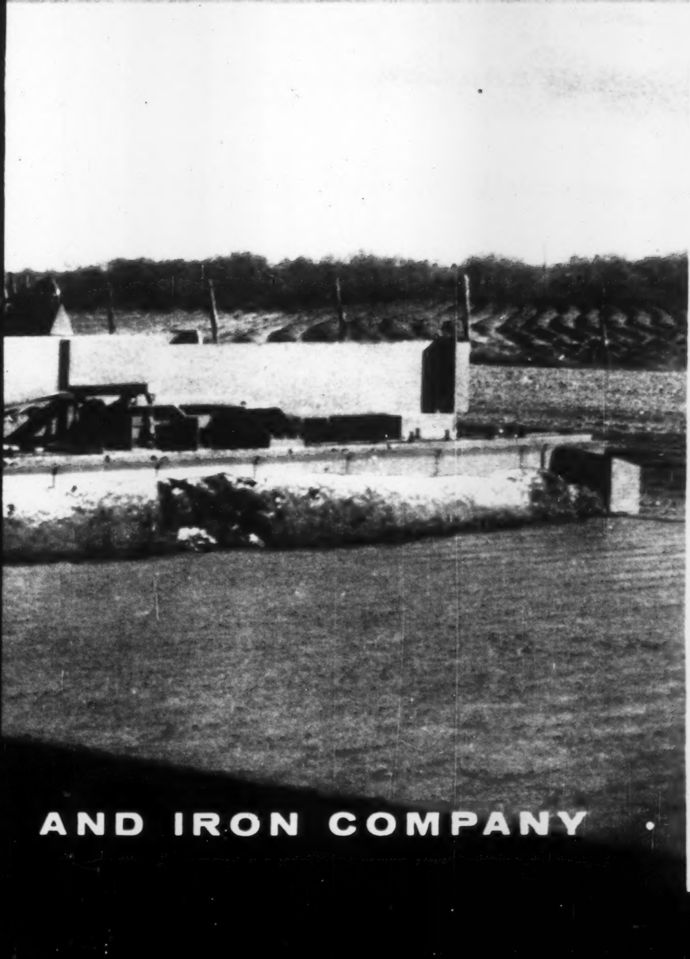

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CIRCLE M-6 READER SERVICE CARD

Utah Highway Price Trends

Average unit low bid prices on selected items for work contracted during years 1955-1958

		Avg. Low Bid Unit Prices			
Item	Unit	1955	1956	1957	1958
Exc, uncl rdwy	cy	$0.401	$0.416	$0.463	$0.468
struct	cy	2.112	2.016	2.511	2.156
Borrow, imported	cy	0.201	0.263	0.252	0.262
Overhaul, cl A	sta yd	0.013	0.014	0.014	0.013
Bit matl, asphalt					
100-120 pene	t			33.576	34.67
road mix, MC-3	t		36.802	34.642	38.757
SC-3	t		34.00		33.347
RS 1-2	t		44.00	47.667	41.875
surf treat, RC 1-4	t		37.92	46.311	40.084
Bit surf, plant mix,					
type A	t	2.40	2.685	2.938	2.731
type B	t	2.615	2.892	3.282	2.966
conc, type C	t	3.85	3.673		3.684
type D	t	4.15	3.867		3.450
Scarify & mix, 24	mi	581.15	721.468	782.131	800.029
Port cmt stabilized base crse, 7"	sy	0.336	0.373	0.317	0.365
	sack	1.295	1.369	1.36	1.304
Grav surf, type B	t	0.75	0.886	0.991	0.83
base course	t	0.678	0.792	0.837	0.791
Base crse matl, sel	cy	0.528	0.550	0.731	0.539
Backfill, granular	cy	2.476	4.192	4.396	5.00
Cover matl, type A	t	2.919	3.615	3.847	3.922
Roll, tamp roller	hr	7.786	8.277	7.934	7.847
pneu tire or power	hr	6.912	7.245	7.046	7.534
Mech tamping	hr	6.469	5.612	6.412	6.801
Clear & grub	ac	70.868	57.813	68.142	191.475
Watering	Mgal	1.152	1.427	1.436	1.218
Steel, reinf	lb	0.128	0.145	0.151	0.139
struct	lb	0.171	0.230	0.237	0.212
handrail	lf	11.236	12.488	13.396	10.503
Concrete, cl A	cy	55.759	62.50	70.186	64.438
cl AA	cy	72.71	86.043	94.813	92.249
cl B	cy	48.202	91.00*	64.00	49.936
curb, tp 1-E	lf	2.081	1.338	1.640	1.552
tp 1-F	lf	1.762	1.524	1.381	1.449a
curb & gut, tp 3 M	lf		2.561	2.337	2.406
base pave, 7"	sy	5.271	2.893	4.979	3.375
sidewalk, 4"	sy	3.385	3.659	3.617	4.295
Remov exist pave	sy	0.81	1.151	0.76	1.744
curb & gutter	lf	0.314	0.67	0.696	0.432
Test piles, treated	lf	15.00		10.00	
other than timber	lf	9.143	11.20	12.00	
Piles, treat timber	lf	2.10		2.72	3.00
untreated timber	lf	2.50		1.80	2.047
other than timber	lf	6.889	8.35	7.619	9.465
Surface ditch	lf	$0.151	$0.142	$0.141	$0.135
Exc, small ditches	cy	0.642	0.666	0.947	0.829
Riprap, loose	cy	4.40	2.988	3.261	2.298
hand placed	cy	4.50			5.313
Grd rail, deep beam, with conc posts	lf		3.73	3.722	3.525
Guide posts	ea	6.939	7.034	7.954	7.564
R w fence, type B	lf	0.282	0.319	0.336	0.345
met post	lf	0.311	0.336	0.40	0.37
Gates, 10'	ea	25.787	32.50	34.773	42.217
12'	ea	44.348	34.706	39.25	40.789
14'	ea	42.352	41.89	39.655	43.75
16'	ea	42.521	48.744	45.633	56.644
Lumber, treated	Mfbm	249.714	300.00	585.342	441.694
Cor met pipe, 15"	lf	3.015	3.335	3.696	3.543
18"	lf	3.616	3.939	4.672	4.217
24"	lf	5.108	5.754	6.34	6.267
30"	lf	6.217	7.193	7.766	7.813
36"	lf	10.012	11.322	12.235	12.488
48"	lf	14.154	15.885	17.644	16.792
CM pipe arch,					
22"x13"	lf	3.962	4.593	4.511	4.231
29"x18"	lf	5.676	6.613	7.47	6.545
RCP, 15"	lf	3.076	3.456	3.528	3.24
18"	lf	3.851	4.321	4.371	4.533
24"	lf	5.816	5.833	6.424	5.802
30"	lf	7.795	9.241	9.063	8.377
36"	lf	10.358	12.078	12.597	11.818
48"	lf	17.312		16.25	19.178
end sect, 24"	ea			70.00	58.454
36"	ea			150.00	124.00
Spec alk resist pipe, tp A, if CMP is used, 15"	lf	3.908	3.810	2.457	4.20
18"	lf	4.642	4.942	5.129	4.917
24"	lf	6.967	7.504	8.062	7.265
30"	lf	8.552	9.50	9.893	9.049
36"	lf	13.344	14.10	15.504	14.158
48"	lf	18.25	19.35	21.30	19.956
CM arch, 22x13"	lf	4.992	4.63	7.358	5.50
29x18"	lf	7.366	7.063	8.793	9.592
R w markers	ea	6.896	7.202	8.366	8.222
FAP markers	ea	28.613	30.061	35.00	32.335
Motor grader	hr	8.57	11.405	9.455	11.481

* For 1½ cu yds only

Highway Prices—District of Columbia

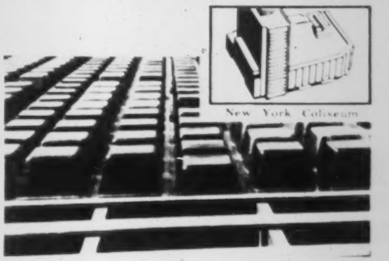
Average and range of selected unit bid contract prices, 2nd half 1958

		No.	Unit Prices		
Items	Unit	Jobs	Avg.	Range	
Bridges					
Excavation, struct	cy	3	$4.78	$4.00–	$6.35
Dampproofing	sy	2	1.27	0.75–	1.80
Backfill & fill	cy	2	2.22	1.45–	3.00
Membrane waterproofing	sy	3	3.06	2.30–	4.00
Conc, cl BB, subfndn	cy	2	22.50	20.00–	25.00
footing	cy	3	41.53	29.60–	50.00
wall	cy	3	53.66	44.00–	60.00
superstruct	cy	3	80.53	79.60–	82.00
Steel, reinforcing	lb	3	0.14	0.13–	0.166
struct carbon	lb	3	0.182	0.147–	0.22
Stone masonry facing	cf	3	6.66	6.00–	7.50
Roads					
Excavation, ordinary	cy	11	3.20	2.50–	3.85
hard surf	cy	10	4.84	4.25–	6.20
hard surf, hand	cy	9	14.20	6.80–	18.00
Borrow for embankments	cy	6	3.29	1.80–	4.00
soil base	cy	8	4.17	3.50–	4.85
Base crse, soils, 8" deep	sy	5	1.08	0.90–	1.23
Borrow for trench bkfl	cy	3	3.72	2.50–	4.65
Reinf port cmt conc pave	cy	6	35.33	28.00–	50.00
8"	sy	7	7.50	7.20–	8.00
Wire fab reinf, 50#, add	sy	8	0.72	0.60–	1.00
Standard cement, add	bbl	8	5.18	4.00–	6.25
Calc chlor for accelerate	lb	10	0.05	0.03–	0.06
Reinf port cmt conc base	sy	7	6.75	6.25–	7.00
	cy	8	35.81	27.00–	65.00
Drwy & alley entrances, port cmt conc for, 7"	sy	8	7.51	7.20–	7.80
exp jt filler add	lf	9	0.89	0.60–	1.30
PCC sidewalk, repair	sy	10	5.80	4.95–	6.30
Exp jt filler, sidew, add	lf	9	0.60	0.35–	0.90
PCC curb, tp A, 15"	lf	4	2.80	2.55–	3.25
var width & depth	cy	3	61.00	48.00–	85.00
curb & gut, tp A	lf	9	3.46	2.25–	3.95
gutter	sy	6	10.42	8.50–	15.00
Roads (Contd.)					
Portland cmt conc					
cl A, bus stops	cy	3	$46.00	$40.00	$50.00
cl B, islands	cy	4	52.88	45.00	64.00
Brk sidew, repair or repl	sy	5	4.30	3.50	5.50
Cut to neat line	lf	6	1.13	0.42	2.00
Anchor bolts	ea	3	$2.75	$2.25	$3.00
Circ stn curb set, 8x12"	lf	3	4.05	3.25	5.00
Str or cir stn curb, 8x8", 8x12", 6x20" reset	lf	7	3.36	2.50	4.00
Haul old curb to D.C. property yard	lf	8	0.98	0.40	1.65
Dist MH frame & catch basin cover a	ea	11	14.68	7.50	25.00
Water vlv frame casing a	ea	7	14.21	7.50	25.00
PUC MH frames, less than 6 sq ft a	ea	5	18.40	12.00	25.00
Pave, sht asph, incl asph conc binder	sy	4	2.21	1.95	2.60
Asph conc binder	t	5	17.70	14.00	22.00
modified	t	5	16.20	15.00	18.00
Sheet asph surface	t	7	19.36	16.00	22.00
Asph conc base, cl A	t	10	15.50	12.50	20.00
surf, cl C	t	8	15.64	9.80	19.00
surf by htr meth repair	t	4	27.63	23.00	32.00
PCC, cl B, walls, steps & copings	cy	• 6	98.33	75.00	125.00
Topsoil, 4" deep	sy	5	0.86	0.75	1.00
Stone masonry walls	cy	4	104.00	90.00	120.00
MH frames & covers, sewer & water furnish	ea	8	56.88	40.00	90.00
Cmt conc circ curb, alley & driveway corners	lf	3	3.50	3.00	4.00

• 1958, 1st quarter, ENR 12 4 58 a Adjust

Unit Prices continued on p. 116

GRID SYSTEM CONSTRUCTION USES CONCRETE TO MAXIMUM ADVANTAGE!



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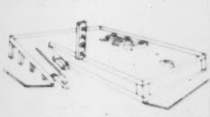

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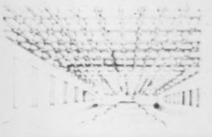

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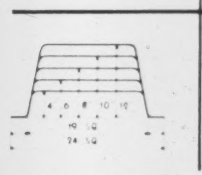

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KINNEAR
ROLLING DOORS
Saving Ways in Doorways

Kentucky Highway Prices

Average Unit Low Bid Prices on Selected 1958 Items

Items	Unit	Total Quantity	Average Unit Price
Agg, dense gr base, plt mix, limestone	t	2 171 894	$3.399
Cr limestone, traf bd mac	t	388 905	3.169
binder mix	t	761 390	4.275
entrances	t	123 452	3.467
Bank gravel base	t	211 959	1.828
Bit conc base, limestone	t	183 532	6.488
mod, limestone	t	727 421	7.299
river gravel	t	51 910	7.638
binder, limestone	t	186 117	7.008
surface, limestone	t	1 000 067	7.454
river gravel	t	117 745	7.122
Tar, RT-2	gal	5 383 135	0.255
Asphalt, emuls, RS-1	gal	1 370 140	0.161
RS-2	gal	560 940	0.187
liquid, MC-4	gal	15 130 783	0.164
Inlet, median box, 15"	ea	217	219.355
roll curb box, A	ea	199	382.286
C&G box, A	ea	157	386.522
Adjust MH frame to grade	ea	334	37.768
Manhole	ea	145	395.759
Curb & gutter	lf	110 292	3.618
Curb, cmt conc lip	lf	86 716	0.181
roll integral	lf	55 642	0.771
integral	lf	43 590	0.879
Curb & gutter, roll	lf	29 499	3.917
Bit conc roll curb	lf	129 851	0.62
Handrail, aluminum	lf	46 662	7.126
Lumber, creosoted	Mbm	122	287.538
Piling, RC 14" furnish	lf	26 693	6.048
drive	lf	26 081	5.698
16" furnish	lf	25 535	6.127
drive	lf	25 181	5.051
steel, 12" furnish	ulf	143 170	4.017
drive	lf	143 170	2.97
Steel reinforcement	lb	39 340 197	0.136
structural	lb	9 572 301	0.232
reinf, prestr	lb	42 990	0.85
Dry stone masonry	cy	2 000	60.00
Pipe entire RC std, 15"	lf	91 718	3.97
CMP, bit ctd, 16 ga, 15"	lf	104 516	3.977
Pipe culv, RC 111, 18"	lf	137 179	5.043
24"	lf	49 698	6.980
CMP culv, bit ctd, 18", 16 ga	lf	76 910	5.26
24", 14 ga	lf	25 910	7.177
Perf pipe, 6" vit clay	lf	1 140	2.158
6" concrete	lf	8 308	2.238
Sewer pipe, 6" concrete	lf	2 158	1.594
8" concrete	lf	2 674	3.117
Cement concrete base	sy	22 444	5.275
Calcium chloride	t	2 923	69.409
Clear & grub	ac	13 408	167.227
Concrete, cl A	cy	238 526	61.818
cl B	cy	3 468	55.547
Ditching & shouldering	mi	1 202	756.516
Ditch, surface, 2 sq ft	lf	25 935	0.346
Excavation, roadway	cy	39 581 607	0.658
borrow	cy	3 762 711	0.739
struct, common	cy	193 596	6.134
solid rock	cy	49 891	12.262
uncl	cy	212 479	5.375
Fence, right of way	lf	851 697	0.627
Guard rail, steel beam	lf	365 204	2.880
posts, timber	ea	38 021	6.122
Concrete median, 4'	lf	17 731	4.148
Overhaul	yd sta	11 394 461	0.014
Pavement, cmt conc	sy	1 274 991	5.595
Project monument	ea	485	38.586
Riprap, cyclop, stone	sy	42 029	7.018
Right of way markers	ea	4 639	7.622
Scarify & reshape	sy	72 390	0.047
Sidewalk, conc, 4"	sy	66 496	1.221
Slope protection, conc	sy	34 310	6.841
Stabilization, cement	sy	112 501	0.581
Crib wall, metal	sf	16 934	5.467
Water	Mgal	263 511	1.517
Seed & protect, method 3	sy	14 846 237	0.066

1949 51 prices, ENR 4 3 52 1952 prices, ENR 4 2 53
1953 54 prices, ENR 3 24 55 1954 55 prices, ENR 2 9 56
1956 57 prices, ENR 6 19 58

Vermont Highway Prices

1958 Primary Average Weighted Low Bid Prices, Major Items

Items	Unit	Avg. Wgted Unit Prices
Excavation, common	cy	$0.49
solid rock	cy	3.08
uncl	cy	0.66
Borrow	cy	0.45
Trench excavation, earth	cy	1.83
rock	cy	8.03
Clear & grub	ac	1,135
Fine grading, subgrade	sy	0.06
Channel excavation, earth	cy	0.73
rock	cy	4.06
uncl	cy	1.92
Structural excavation	cy	5.71

(Continued on page 118)

6 men install 970 feet of Corrugated Metal Pipe in 3 days

In the picture you see sections of 36″ diameter, one-half asphalt-coated and paved, Corrugated Metal Pipe, ready for installation on US Route 230 just off the Pennsylvania Turnpike. Lane-Penncarva Inc. supplied 970 lineal feet of this pipe for a storm sewer extension. Six men installed every foot of pipe in three days!

Speed like this was possible because Corrugated Metal Drainage Products are light and easy to handle. Easily loaded, easily trucked and easily installed, they don't have to be babied because steel stands up under punishment that would crack or break other materials. This pipe was made from tough USS Corrugated Galvanized Culvert Sheets. It's doubly protected from corrosion—under the asphalt coating is a heavy, uniform coat of zinc.

Metal culvert sheets make strong, long-life drainage structures. Being flexible, metal culverts deflect under load and gain support from the passive resistance of the compressed soil around them. This is why metal pipe can withstand the crushing weight of deep fill *and* the vibration and impact of heavy loads over shallow fill.

For more information, write for our free booklet, "USS Culvert Sheets"; United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

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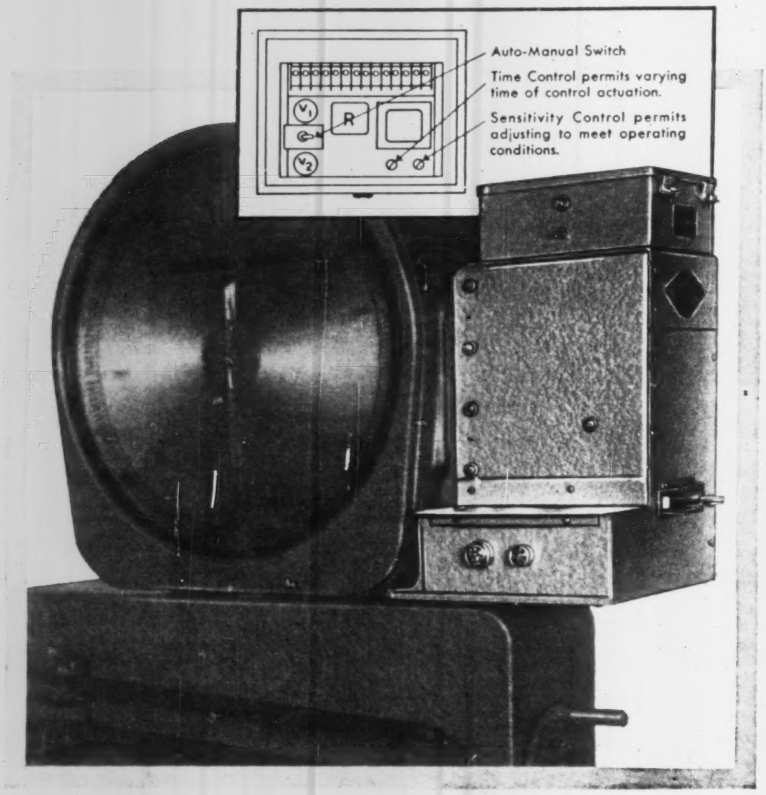
NEW

Fairbanks-Morse

Electronic Weight Detector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Time Control permits varying time of control actuation.
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With the new Electronic Weight Detector, true weight of any load can be automatically obtained and recorded without need of a weighman. Where a weighman is used, it is impossible for him to record incorrect weights or start a sequence at the wrong time. When desired, a flip of the switch can disengage the Weight Detector entirely from the system. *This is the first fully-reliable control of its kind available in the scale industry.*

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GENERATORS • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

. . . Vermont Hwy Prices

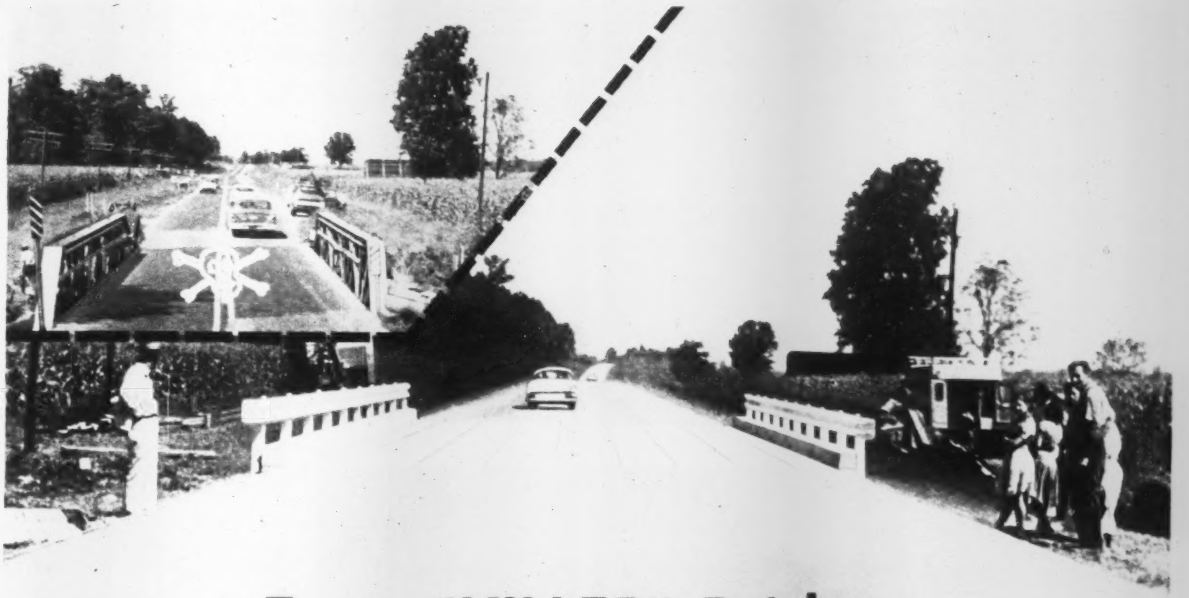
Item	Unit	1958 Avg. Wgted Unit Prices
Roadway patrol maintenance	day	$61.20
Dust control	Mgal	4.50
Drill & blast solid rock, subgrade, modified	sy	1.69
Excavation, muck	cy	0.50
& removal of old roadwy surf	cy	0.78
& removal of cmt conc pave	sy	0.76
Bulldozer rental	hr	12.91
Subbase, gravel, measured in pl	cy	1.02
sand	cy	0.99
cr grav, fine graded	cy	3.04
Macadam base course	cy	5.46
Gravel overhaul, modified	cy mi	0.10
backfill	cy	2.62
pits strip	cy	0.15
Dbl tack coat, Peastone seal -		
refined tar	gal	0.44
cutback asphalt	gal	0.47
bit matl, prime coat of refined tar & dbl seal ct cutback asph	gal	0.53
Single tack coat, refined tar & sand cover	gal	0.41
cutback asph & sand cover	gal	0.32
Bit conc pavement, dense graded bottom & top crse modified	t	9.08
Bit conc pave, bridge floors, mod	t	30.48
Conc, cl B, modified	cy	58.75
Steel, reinforcing	lb	0.14
structural	lb	0.15
Cement rubble masonry	cy	47.19
Asph asbestos coating	sy	5.34
Reinf conc pipe, 15"	lf	4.30
18"	lf	5.08
24"	lf	7.65
30"	lf	8.67
36"	lf	13.04
Corr galv met pipe,		
asph ctd, 12"	lf	3.69
15"	lf	4.43
18"	lf	4.91
24"	lf	7.51
30"	lf	10.86
36"	lf	15.34
48"	lf	19.19
arch, 36x22"	lf	12.00
Pipe culverts relay	lf	1.45
Corr galv met plate pipe	lb	0.25
arch	lb	0.29
Sleeves for water pipe	lf	1.28
Piling, treated timber	lf	2.89
steel	lf	5.81
Stone fill, heavy type	cy	4.23
slope protection	cy	2.97
Riprap, bank protection, modified	cy	6.78
CIP underdrain flushing basins, cast iron covers	ea	82.55
Prcst reinf conc pipe drop inlet, with cover	ea	207.68
Drop inlet grates, steel	ea	58.05
Grd rail, plank, preserv treatment	lf	3.99
3 cable with steel posts	lf	2.07
anchors	ea	52.40
Guide-posts, steel	ea	11.54
Marker posts, steel	ea	7.59
Grd rail, remov & dispose of exist	lf	0.31
Bit grtd stone gutter	sy	3.66
Granite curb	lf	3.89
bridge curb	lf	5.73
Project markers erect	ea	31.94
Boundary markers	ea	15.50
Winter rye	lb	0.42
Seeding	lb	0.96
Sodding	sy	3.08
Fertilizer, commercial for grass	lb	0.18
Topsoil	cy	2.83
Mulch, modified	1	97.38

Average unit prices on 1957 selected items were reported in ENR 6-19-58, p. 90

Georgia Highway Prices

Average low bid prices on selected principal items, 1958

Items	Unit	Average Unit Price
Excavation, uncl	cy	$0.27
Conc, cl A, culverts & bridges	cy	46.63
Steel bar reinforcing	lb	0.134
Conc C. D. pipe, 15"	lf	3.03
18"	lf	3.83
24"	lf	5.27
30"	lf	7.34
36"	lf	10.16
42"	lf	13.19
48"	lf	15.75
54"	lf	18.37
60"	lf	25.83
Riprap, plain	sy	5.94
Base material, local	cy	0.56
Shoulder material, selected	cy	0.58
Subgrade treatment material	cy	0.53
Single surface treatment, type 1	sy	0.21
Liquid seal	sy	0.13
Asphaltic binder, hot	t	4.94
concrete surfacing	t	4.71
material, AC-8	gal	0.14



From "KILLER"-Bridge to King-Size Bridge

—in 17 hours!

with **AMDEK** Concrete Beams

Only 17 hours were required by the Indiana State Highway Department to eliminate a deadly old "Killer" Bridge and replace it with a modern, wide structure near Scottsburg, Indiana. This new Amdek Bridge is not only safer to cross but is constructed of maintenance-free concrete.

American-Marietta Company makes precast concrete beams for spans up to 36 feet and prestressed beams for longer spans. All are economical and made under factory-controlled conditions—delivered to the job quickly from American-Marietta plants strategically located throughout the nation.

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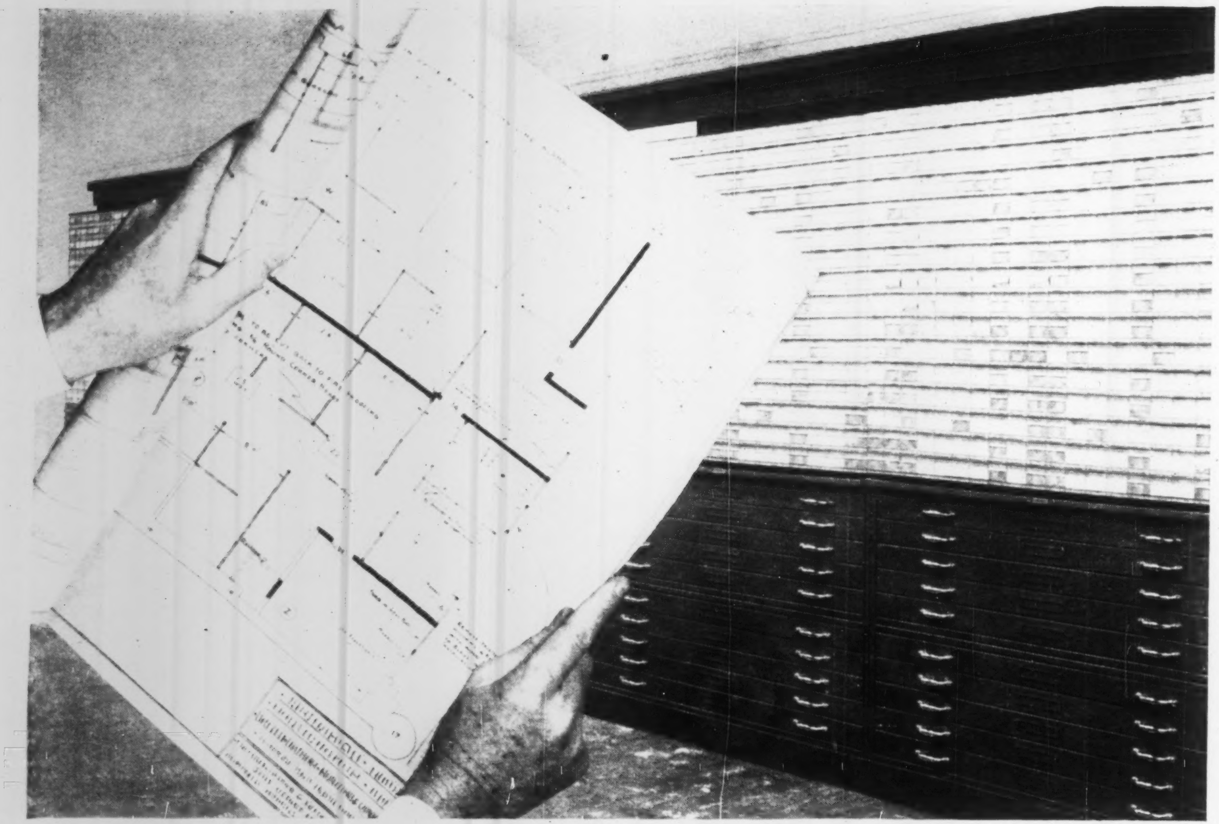

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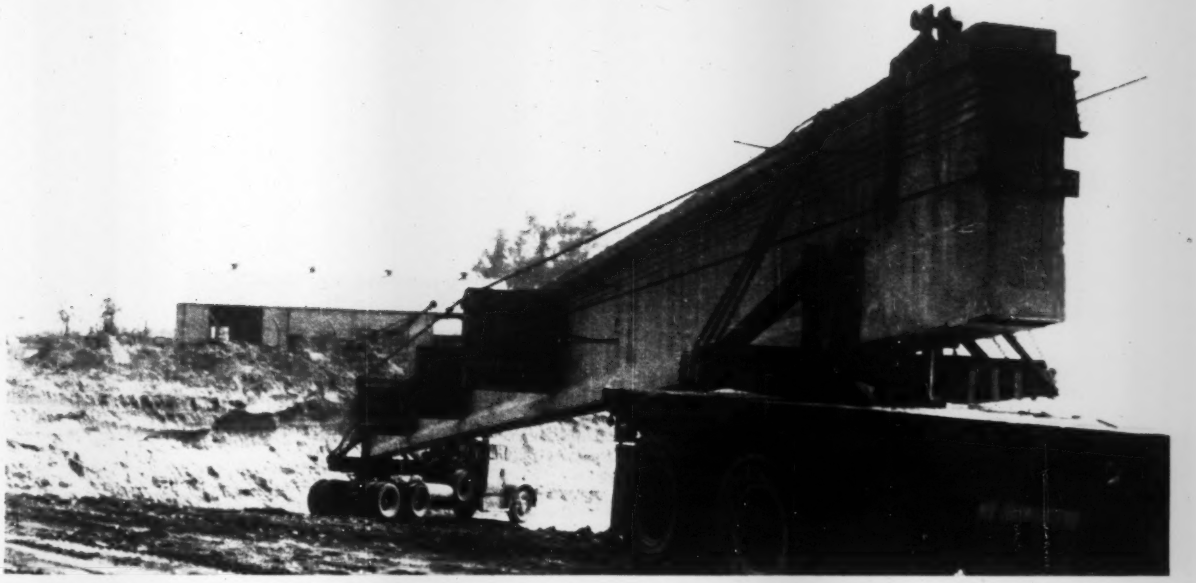
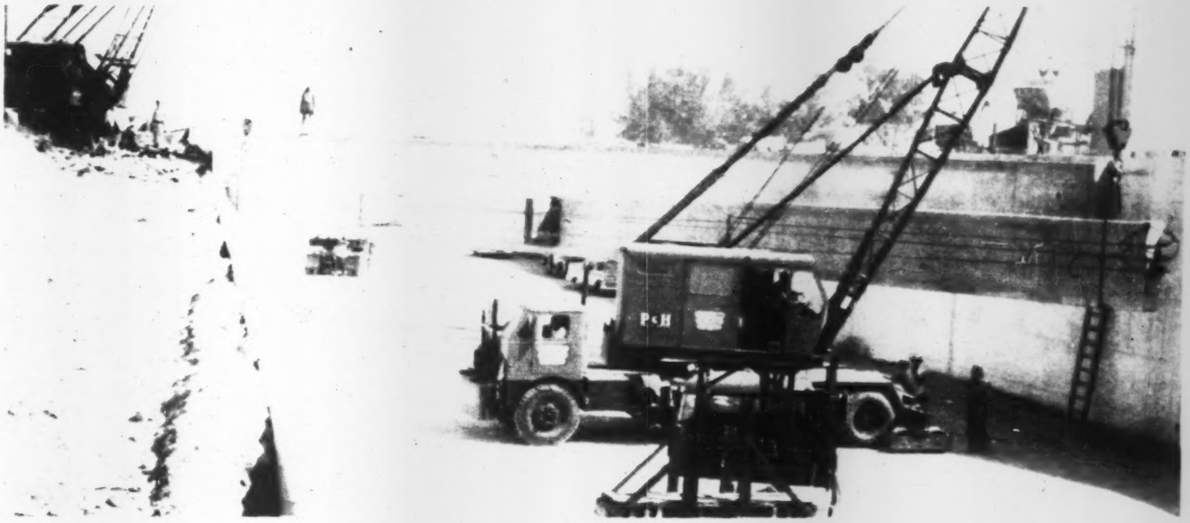
Field and Office



Back-to-Back Trucks Transport . . .



. . . Long Girders for a Bridge

The contractor had to cope with special problems of stressing, transportation and erection in constructing the girders of five bridges over a flood control channel in southern California. The largest girders were 116 ft long. They weighed 50 tons each. The toughest problems included:

- Controlling post-tensioning operations at both ends of the girders.
- Providing adequate rigidity during transportation.
- Furnishing special transportation.
- Erection of the long, heavy girders from the streambed rather than from the roadway approaches.

The bridges are located over the Big Dalton Wash flood control channel. The project is on the San Gabriel River drainage system, which is currently the most critical flood-control construction area in southern California.

There are 31 post-tensioned concrete girders in the five bridges. Thirteen

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girders are in the 116-ft class. The others range in length from 63 ft to 85 ft. They were all cast and post-tensioned in a plant at Azusa, Calif., and transported about six miles to the job site.

The bridges contain simple spans only. The girders have an I-type cross-section. The 116-ft girders are 5 ft, 6 in. deep, with 1-ft-7 in. wide flanges and 7-in. webs.

• Steel forms—Continuous steel forms were used to cast the girders. Only two sections were needed for the entire 116-ft length. Each half was set and removed by a 20-ton crane.

The forms consisted basically of a single sheet bent to shape and backed with diaphragms spaced 16 in. c-c. This gave an extremely rigid form and a very close tolerance on the cross-section of the member.

Because of the number of stressing tendons, thinness of the web and height of girder, considerable care had to be exercised in placing the concrete. Both external and internal vibration were used. The concrete mix contained 7.5 sacks of cement per cubic yard. It had a maximum slump of 3 in., and contained an air-entraining additive. Minimum specified compressive strength at time of post-tensioning was 5,000 psi.

• Post-tensioning—Each of the 13 long-span girders was post-tensioned with eight tendons. Each metal-sheathed tendon was made up of 16 high-strength stressing wires. A total force, after losses, of 850,000 lb was applied to the eight tendons of each girder. This total load was distributed throughout the tendons. It varied from 105,000 lb to 113,000 lb each, depending on the tendon longitudinal curvature.

During the post-tensioning, power phones were used from one end of the girders to the other to help regulate the rate of elongation of the stressing wires. This rate of elongation had to be kept about the same at both ends of the girders.

The post-tensioning was carried out using two 100-ton hydraulic rams. The rams and gages were calibrated before stressing and the load to each girder was checked against the elongation of the tendons. Total elongation of each tendon was about nine in.

Girders were stressed in equal increments from each end simultaneously to assure uniform stress. It also minimized stressing losses. Friction between the wires composing the tendon and the metal sheathing was compensated by overstressing.

• Adding rigidity—Preparing the girders for the six-mile trip from casting plant to bridge site was an unusual problem. Because of their slender cross-section, the girders were extremely flexible with respect to their longitudinal axis. It was therefore necessary to increase the moment of inertia about the Y-Y, or vertical, axis of the girders to add rigidity during transportation and erection.

Various methods were investigated. The solution was to place struts under considerable tension along the sides of the girders.

Each strut consisted of two lengths of No. 8 reinforcing bar and one length of 1¼-in. dia wire rope. In some cases, depending on the equipment at hand, the 1¼-in. wire rope was replaced by five ⅜-in. strands of post-tensioning wire.

Three struts were placed on each side of a concrete girder. The center unit of a strut served as a king-post truss; the two outer units acted as queen-post trusses.

The long girders are stable when the design loads are applied in the normal fashion in the completed bridges. Adequate lateral stiffness is provided by cast-in-place intermediate diaphragms and the concrete deck.

When loads are imposed during moving operations, however, the girders become somewhat less stable, since they lack lateral stiffness. To illustrate the effect of any motion, a comparison of the moments of inertia can be made.

The girders, as designed, have an I_{x-x} (moment of inertia about the horizontal axis) equal to 383,000 in.^{4} and an I_{y-y} equal to 12,000 in.^{4} This is a ratio of 32:1.

When the struts were added, the I_{y-y} was increased to 90,000 in.^{4}, thereby reducing the ratio to 4:1. This added sufficient stiffness to reduce the disturbing side deflections to virtually zero.

• Double trucking—Special transportation facilities had to be provided in moving the girders from plant to bridge site. Single trucks were tried, with the rear end of the girder attached to a dolly. But this method didn't work.

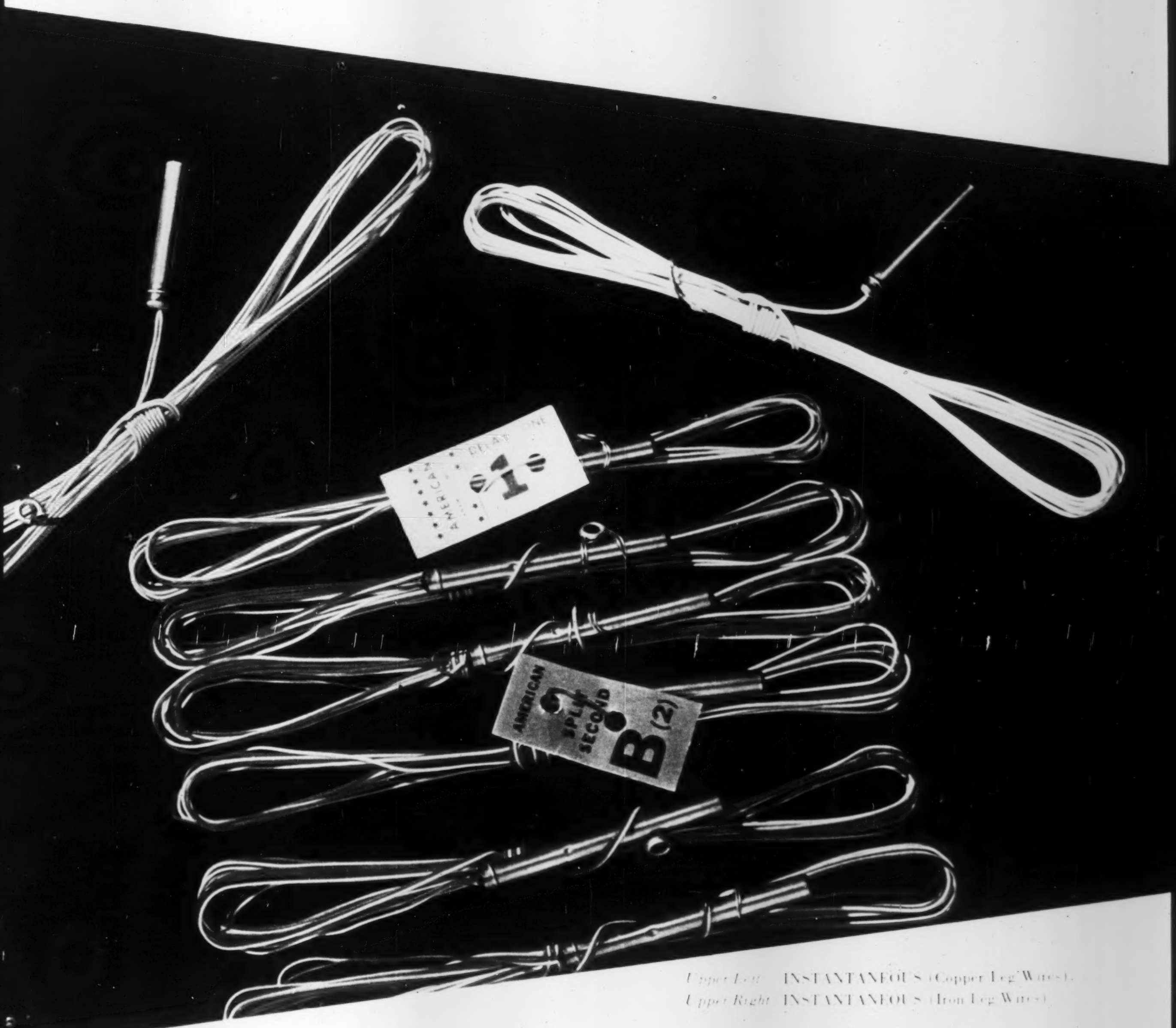
The answer was to use two trucks, back-to-back, with one under each end of the girder. This arrangement gave both the fore-and-aft and roll stability that was deemed necessary.

Only the lead truck used power, except to negotiate sharp turns. The rear truck was used for steering as with a hook-and-ladder truck, since the entire assembly of trucks and girders was about 156 ft long.

The approaches to the bridge sites were so difficult to maneuver that the girders had to be erected from the bottom of the drainage channel.

In order not to tilt the heavy girders,

a million shots without a miss!!!*



Upper Left: INSTANTANEOUS (Copper Leg Wires).
Upper Right: INSTANTANEOUS (Iron Leg Wires)

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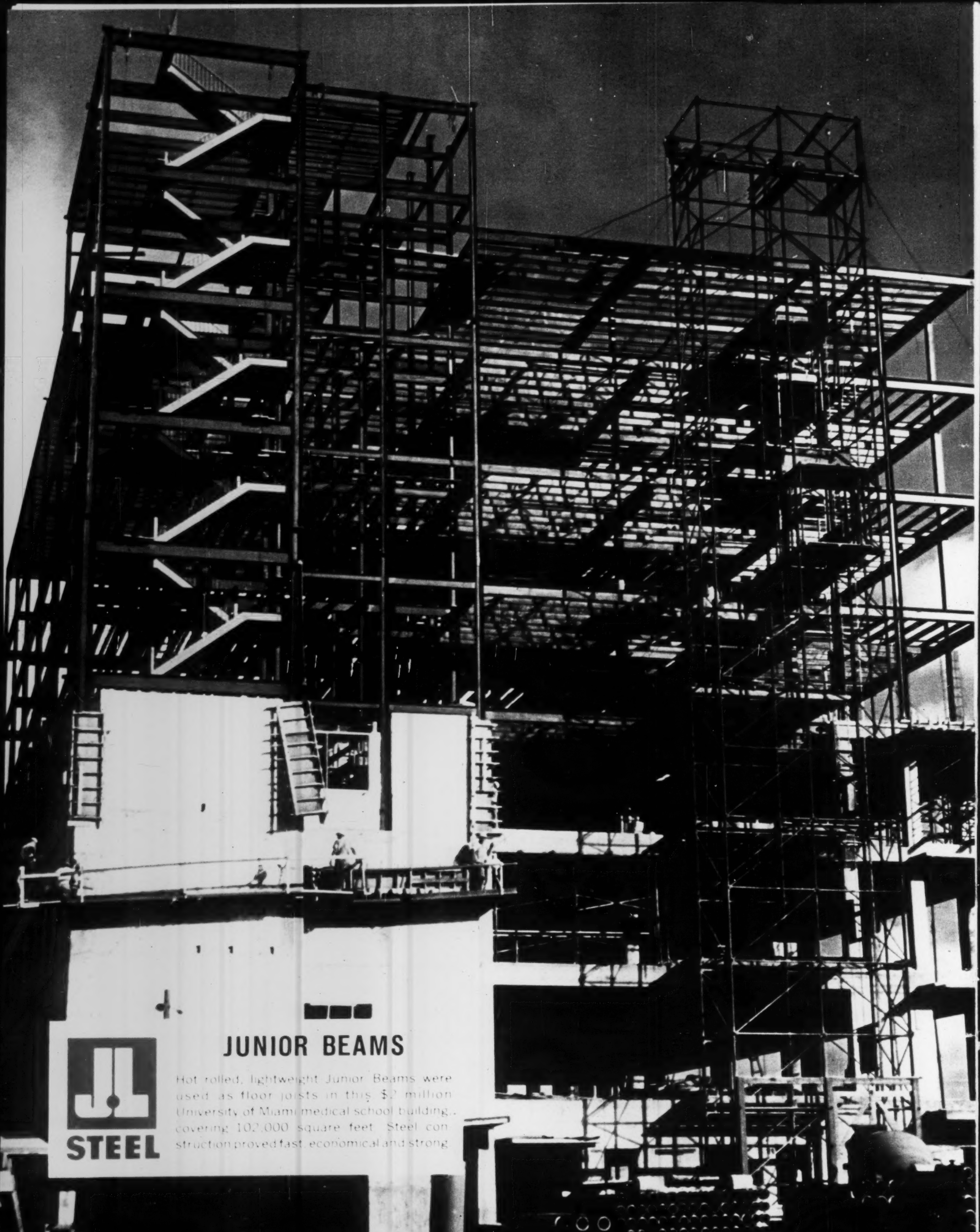

J&L STEEL

JUNIOR BEAMS

Hot rolled, lightweight Junior Beams were used as floor joists in this $2 million University of Miami medical school building, covering 102,000 square feet. Steel construction proved fast, economical and strong.

"We specified Junior Beams for strength in a hurricane area, plus economy and speed in construction"

... reports Miami structural engineer

"We saved considerable time and money by using 12-inch Junior Beams as floor joists in this University of Miami medical school building," states Mr. Winston C. Gardner, structural engineer with Steward-Skinner Associates, designers of the structure.

"Concern for costs, speed of construction and hurricanes dictated the use of steel frames and floor joists. Junior Beams were framed into the main structural members on two-foot centers in spans of 22 feet in each of 25 bays, 18 feet wide."

The Junior Beams also serve as a base for attaching a vermiculite ceiling. Unistrut hangers for plumbing and electrical lines are welded to the bottom flange of the Junior Beam floor joists. Eight tons of J&L Junior Channels were used as stair stringers in two stair wells.

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Junior Beam floor joists, framed below the flange of the main structural members, give greater strength to this nine-story university building.

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General contractor: Edward M. Fleming Construction Co., Miami
Structural steel fabricator and erector: Sheffield Steel Products, Inc., Miami

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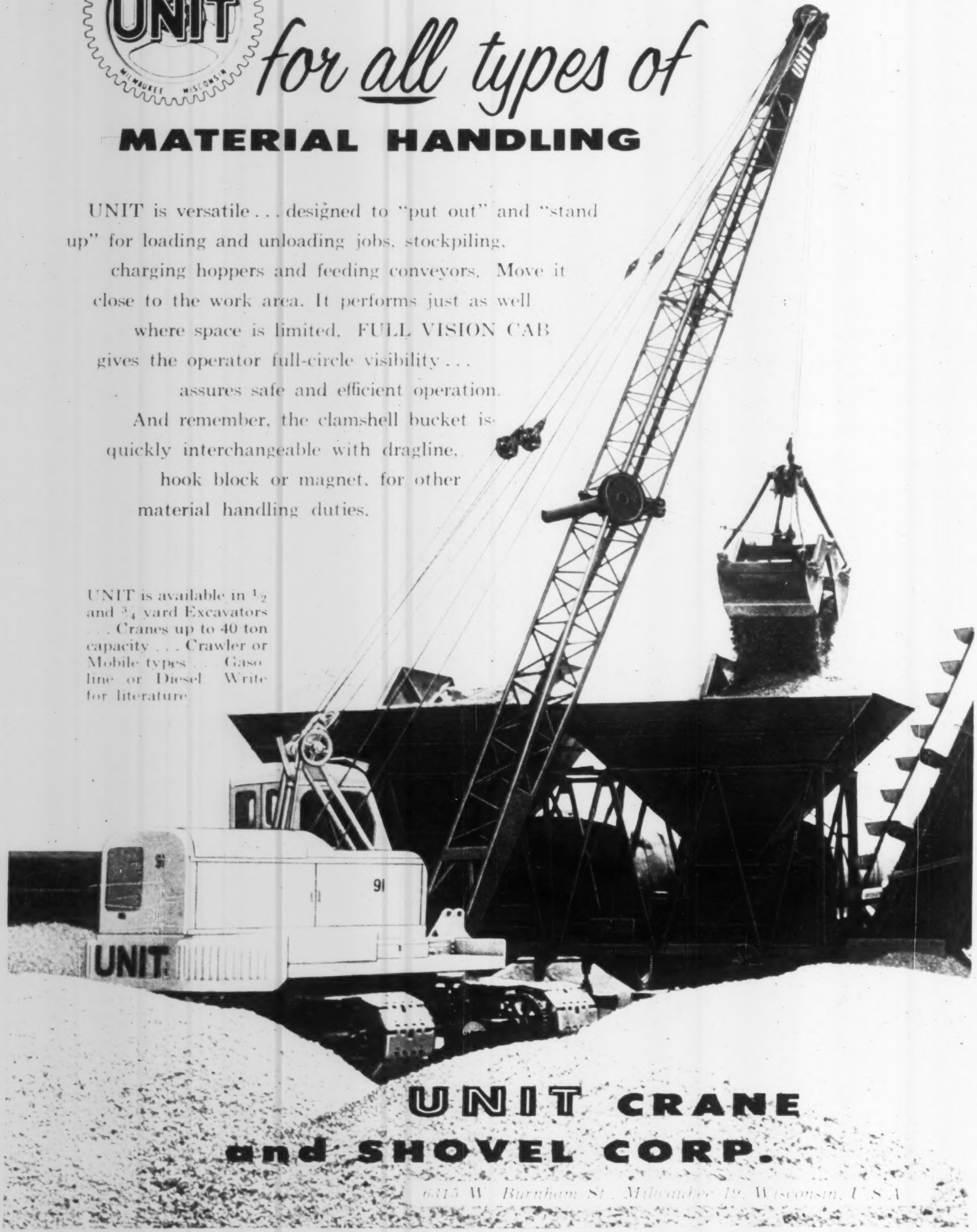

UNIT CRANE and SHOVEL CORP.

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it was necessary that the superelevation on the curved approaches be to the outside of the curve rather than in the normal manner. The lay of the ground was just the opposite to that required.

Careful maneuvering of the trucks was necessary at the second long-span bridge to get the girders into position for erection. After passing over the first long-span bridge, which had been completed, the loaded trucks were driven slightly past the ramp leading down into the flood-control channel at the bridge site. Then the rear truck became the lead truck, pulling the girder and second vehicle down the ramp.

• **Erection**—The 116-ft, 50-ton girders were picked up by a pair of heavy-duty truck cranes and hoisted into final position on the concrete abutments. One crane operated on the paved floor of the flood-control channel; the other on one of the bridge approaches. The side struts were left in place until the girders had been seated on the abutments to avoid any buckling as they were jockeyed into final position.

All five bridges were completed on schedule, just before the start of the normal rainy season.

The successful completion of the bridges on time demonstrated the feasibility of producing long post-tensioned concrete girders in a plant and transporting them to the job site.

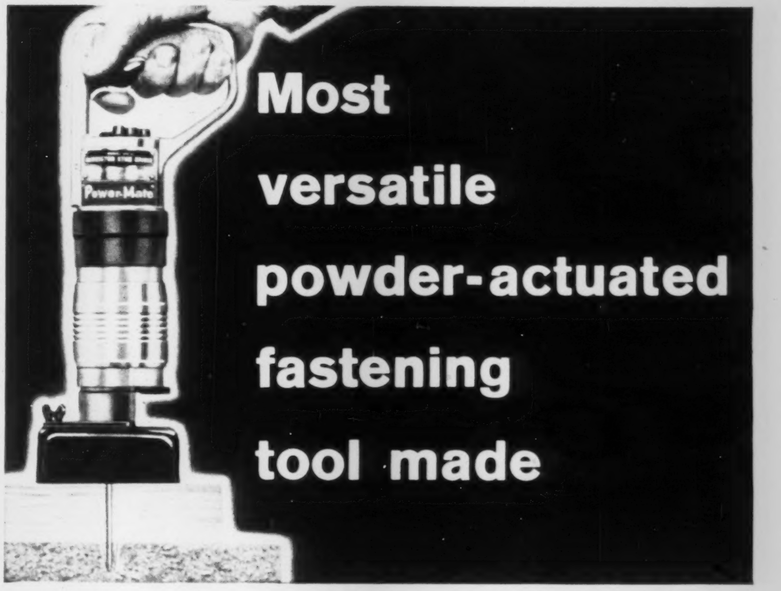
The five bridges were completed last year as part of a $2-million contract for providing a section of the Big Dalton Wash flood control channel. The project is under the supervision of Col. Carroll T. Newton, Los Angeles District Engineer, Corps of Engineers.

MacDonald & Kruse, Sun Valley, Calif. was the general contractor. The 31 girders for the five bridges were manufactured and erected under a subcontract, by the Concrete Conduit Co., Colton, Calif., a subsidiary of American-Marietta Co. W. H. Hyland was in charge of casting and post-tensioning the girders. D. J. Oswald developed the technique of preventing the post-tensioned girders from buckling during handling and hauling operations.

The continuous steel forms for the girders were built by the specification Steel Corp., Colton. The girders were post-tensioned by the Prescon Method, which was used on such structures as the bridge over the Corpus Christi (Texas) Ship Channel (ENR Apr. 23, p. 44 and Sept. 12, 1957, p. 51), and six bridges at the U. S. Air Force Academy, Colorado Springs, Colo. (ENR Jan. 9 p. 43). Hydraulic rams used in the post-tensioning were supplied by the William S. Pine Co., Los Angeles.

(*Field & Office continued p. 129*)

Remington Stud Driver



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Plus choice of 4 fastening attachments . . .

K-1 1/4″ & 3/8″ Light Duty Captive Stud Attachment uses 22 cal. Power Loads. Use where extra safety is needed.

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• Medium-duty fastening—requiring ⅜ studs—can be done with low-cost 22 caliber Power Loads.

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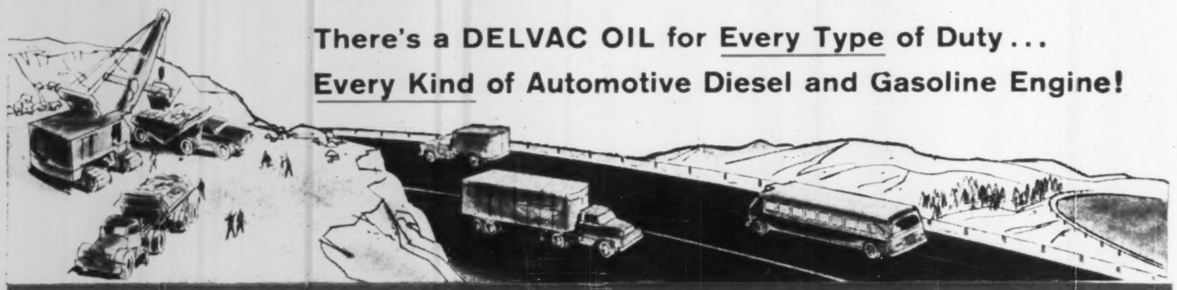

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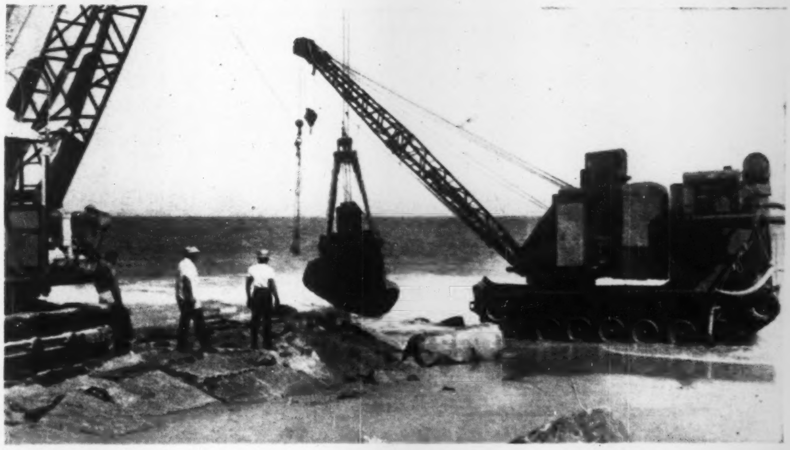
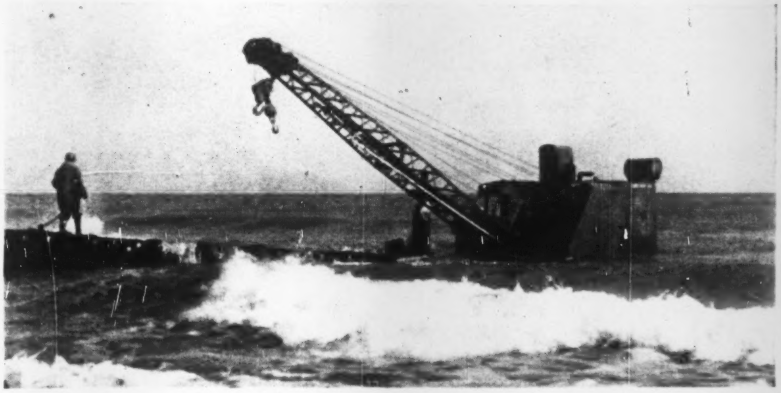


Tank Loses Guns, Gains Boom . . .



. . . Then Joins Battle Against Sea

Seafaring tanks capable of operating in 12-foot ocean tides have joined the Delaware State Highway Department's battle against erosion of the State's valuable beach areas.

The idea came from Warren C. Eastburn, vice president of Henry C. Eastburn and Son, Newark, Del., prime contractor on the highway department's project at Bethany Beach.

Conversion of three of the former Army vehicles to a mobile crane and two carriers, which can operate up to 300 feet off short at low tide, has made it possible for the Eastburn firm to use a new technique in constructing protective groins.

The "Things," as they have been dubbed by Eastburn workers, travel on the ocean bottom. The crane is used to drive pilings and place huge, three- to six-ton, capstones. The two carriers haul the stones from nearby stockpiles to the groin sites. The vehicles eliminate the usual necessity of building falsework to support equipment atop the groins as the structures are extended into the water.

Eastburn, a veteran of three and a half years service with the Navy during World War II, says the idea for the "Things" came to him suddenly when he ran across the medium tank chassis parked on the lot of a heavy equipment hauling firm.

To adapt the vehicles, it was necessary to waterproof the engine and operator's compartment. This was done by erecting a nine-foot-high steel enclosure around both. The upper structure of a crane was mounted on the rear of the chassis. For use in driving pilings, a 4-in. jet pump was installed atop the cab extension. Workmen on the project wear frogmen-type rubber suits.

Storm tide elevations are from 9 to 9.4 ft above mean low water.

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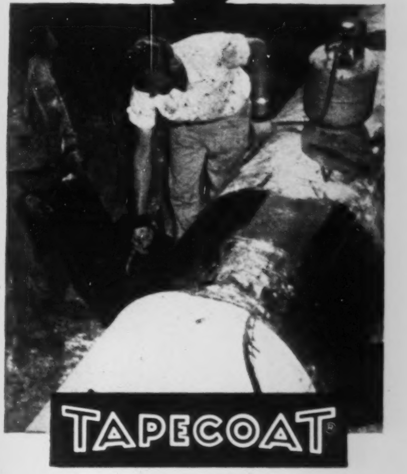

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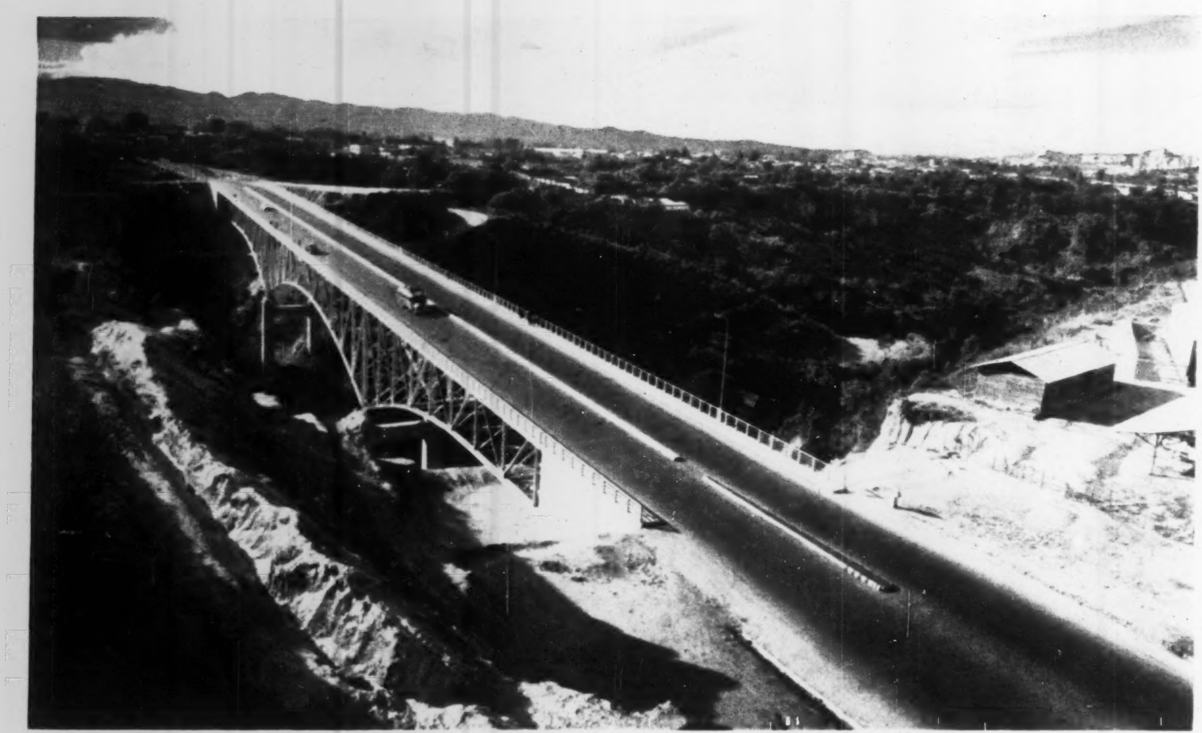

Puente Belice is 730-ft-long steel cantilever bridge on Guatamala's Atlantic Highway.

Engineering Mission to Guatemala:

The American engineering mission to Guatemala started in February, 1955, seven months after the Central American country had overthrown its pro-communist regime.

At that time the government of Castillo Armas had succeeded in picking up the reins of government and was endeavoring to provide for the people.

Among the country's most urgent needs were communications particularly highways, which had been neglected for years.

The previous government had left the following as part of its legacy:

- A 200-mile-long Atlantic Highway only 15% completed after four years and $18 million of government force account work.
- A 316-mile-long Inter-American Highway that had been left abandoned for years after only 83 miles had been completed.
- A 220-mile-long Pacific Highway with only 60 miles completed and no plans for construction of the rest.
- A highway maintenance system and maintenance equipment that were practically non-existent.

Into this difficult situation stepped the new Minister of Public Works, Juan Luis Lizarralde. He retained the New York City firms of Tippetts-Abbett-McCarthy-Stratton and Gibbs & Hill, Inc.

First job of the mission was to prepare a fact-finding report on the three major highways above. This report was used as a basis for a loan application with the International Bank for Reconstruction and Development.

The report called for 160 miles of completed highway, 260 miles of tentative alignment and 320 miles of possible further highway developments.

The programs outlined in the report consisted of three major items:

- Completion of the Atlantic Highway at a cost of $27.2 million.
- Construction of 88 miles to complete the Pacific Highway at a cost of $9.7 million.
- Reorganizing the Guatemala Highway Department and equipping and organizing an efficient highway maintenance department at a cost of $18.3 million over three years.

(The U.S. Bureau of Public Works is supervising development of the Inter-American Highway.)

The World Bank granted an $18.2-million loan to defray foreign currency costs; the International Cooperation Administration contributed $18.2 million for construction of the Atlantic and Pacific Highways; and the Government of Guatemala put in the rest needed for the program, about $18.8 million spread over three years.

With the financing settled, Guatemala retained the two American firms for further implementation of the program.

Careful attention to the relationship between the engineering mission and the Guatemalan engineers was important in implementing the highway program.

The consultants' function was advisory and, of course, temporary. Hence it was necessary to convince the Guatemalan engineers that recommended ac-

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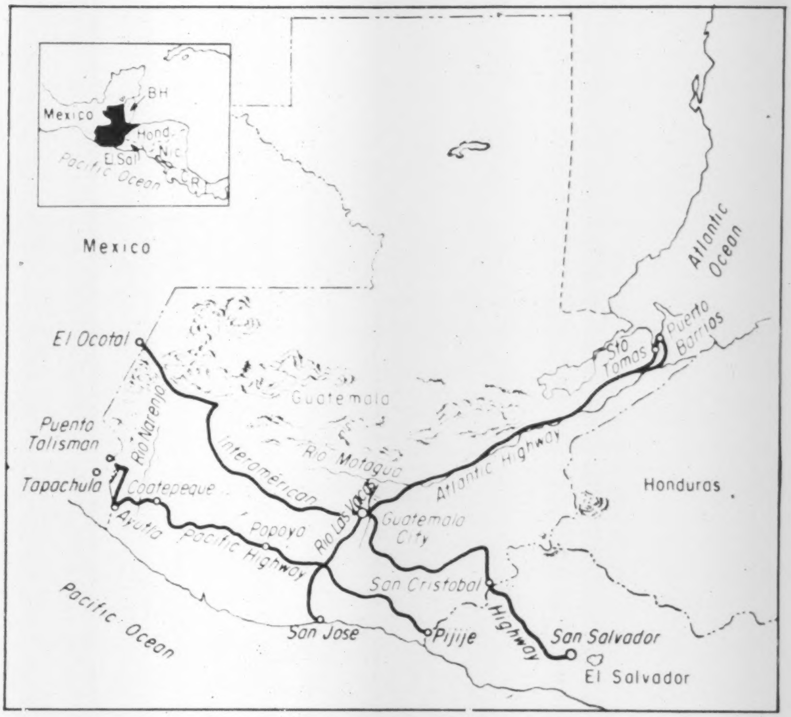
Author E. Per Sorensen, of *Tippetts-Abbett-McCarthy-Stratton, has been general manager of the mission since it started in 1955.*



Three major highways cross the Central American country.

How It Did the Job

tions were desirable before these actions were put into effect.

The "opposite numbers" method of operation proved to be most effective. The consultants' chief bridge designer, for example, dealt almost exclusively with the chief bridge designer of the highway department.

One of the consultants' resident engineers was attached to the highway department's staff of resident inspectors for each major construction job. The consultants' maintenance engineers each covered two or three maintenance zones as advisor to the respective zone chiefs.

In the same manner, the general manager and chief engineer of the consultants, apart from supervising the entire operation of their staff, were available to the public works minister and the highway director for such advice as might be required.

The Guatemalan and American engineers developed and issued a book of standard highway and bridge specifications for the country.

The consultants and the highway department also issued another must—a maintenance manual presenting standard procedure for repair and maintenance of highways.

Maintenance had been one of the highway problems in Guatemala. Previously, the highways were built and maintained by Indian hand labor supervised by military engineers.

The workers were drawn primarily from agricultural workers who provided part-time services in lieu of taxes. Each group worked near its village.

Reorganizing the highway set-up was the first step in the remedy. The country was divided into nine maintenance zones, with borders based on highway maintenance needs rather than on departmental divisions of the country.

Each zone was provided with modern mechanical equipment and equipment repair facilities. A semi-autonomous maintenance organization was established for each zone.

In the beginning, an attempt was made to have civil engineers head up the zones. But it proved difficult to interest the relatively few Guatemalan engineers in this kind of work.

Fortunately, among the military engineers a number of reliable, practical engineers were found who were willing to live in the various zones and who took pride in organizing the maintenance units and in the new equipment.

Monthly reports were established that gave the status of work, finances and condition of maintenance and equipment. The report incorporates a rating system that enables the Ministry or Highway Director to check quickly on performance of field personnel.

Guatemala is thus gradually reaching the point where there are enough able maintenance personnel to weather any change in administration.

The TAMS-G&H staff of American personnel reached 28 during the four-year operation. With completion set for this summer, the staff is gradually being phased-out.

But there will remain an improved highway system, increased efficiency in the highway department—and a substantial reservoir of good will.

The Americans will take with them a better understanding of the technical and human problems in countries south of the border.

• **Atlantic Highway**—The 200-mile-long Atlantic Highway will be the first paved interoceanic highway in Central America when it is completed this year.

The two-lane highway runs from Puerto Barrios on the Atlantic Ocean southwest to the capital, Guatemala City. Another road, already completed, connects the capital to San Jose on the Pacific Ocean.

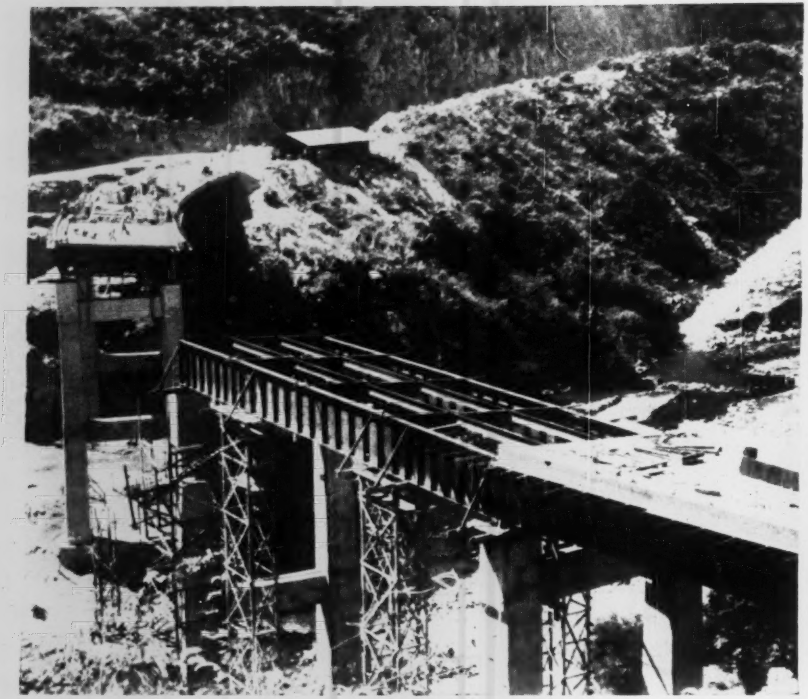
Guatemala City is located on a mesa consisting of a thick layer of volcanic ash. To the northeast and northwest the city is surrounded by quebradas or canyons.

Going toward the Atlantic Coast from the city meant crossing the deep canyon of Las Vacas River, just northeast of the city.

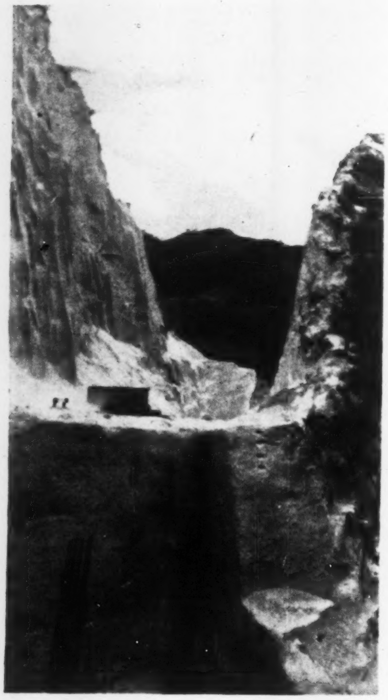
Comparisons were made between 200-ft-high volcanic ash fills and various bridge solutions. Decision was to build a 730-ft-long steel cantilever bridge. The bridge was made four lanes wide for future traffic. Substructure was built by a local contractor; superstructure was supplied by Krupp of Germany.

The bridge, called Puente Belice, is the largest structure of its kind in Central America.

From the bridge to the Motagua River an old 70-mile-long road wound along the highland slopes. Some 14 miles of grading and 10 miles of pilot road construction had already been completed on this stretch. It was the missing 50 miles to the river that



BRIDGE AT AGUA CALIENTE on the Atlantic Highway is 650-ft-long, stands on 75-ft-high piers and is built on a curve of 650-ft radius.



"ALKA SELTZER"—this 200-ft cut got its name because winds filled it with dust.

provided one of the most challenging assignments for the design team of consultants and highway department engineers.

Several alternatives were walked—or rather climbed—before a line was agreed upon. It incorporates several major bridges, including one at Agua Caliente that is 630 ft long and built on a curve of 650-ft radius.

Deep cuts in volcanic ash also had to be made along this stretch of highway. In most instances the cuts will case harden and stand practically vertically.

Balancing fills and cuts was impractical in the very steep mountainous area. High fills were avoided as much as possible and the highway was built by shovel side-hill casting.

The 50-mile length went to Nello L. Teer Co., Durham, N. C. Contract was for $8.5 million. This did not include the bridges, which were contracted separately.

The remaining 135-mile section of the highway between the Motagua River crossing and the Atlantic Coast presented a knotty problem all its own.

Various parts of the road were already under construction by government force account. There were about 5,000 laborers on the job. Plans were practically non-existent or being worked out in the field according to preliminary alignments.

Since it was extremely important for the new government to provide work for its people, it was out of the question to close down the project in order to get the time for normal planning procedures.

As much as possible of the existing work was salvaged and adapted. But some sections had to be abandoned because they could not be fully integrated into a continuous satisfactory alignment.

The need for 54 bridges and numerous box culverts further compounded the problem. On-the-spot decisions had to be made and foundation conditions for bridge abutments evaluated without initial benefit of test borings. As soon as the borings became available, such revisions as were necessary and still possible were made.

Bridge spans had to be estimated and then standard steel superstructures ordered to expedite delivery at a time when structural steel was on a 12-month lead time.

On the whole, the engineering judgment proved sound. Only three of the 54 bridges required some minor adjustments during construction.

In May, 1957, the government declared the Atlantic Highway open all the way from Guatemala City to Puerto Barrios. Paving of all but the last 30 miles should be completed before this July.

Pacific Highway—The 220-mile-long Pacific Highway had about 60 miles completed by February, 1955. At that time the government signed a cost-plus-incentive-fee contract to complete a 72-mile center section between Popoya and Coatepeque.

The remaining 88 miles were built under the engineering mission's program. They consist of the two end sections of the highway.

One was a 49-mile length from Coatepeque to the Mexican border. Many of the contractors on this section were Guatemalans who were generally inexperienced in highway construction of this type.

This, however, made it possible to develop a nucleus of trained Guatemalan engineers and contractors who could assume direction and execution of the many feeder roads. It would not pay to import foreign contractors for this work.

A 39-mile length at the other end of the road brings the Pacific Highway to the San Salvador border. Grading contract was let to a Mexican firm, Constructora El Aguila, S. A. de C. V., which is about to complete the work.

When these connections to roads in Mexico and San Salvador are completed this year, there will be in effect a second Inter-American Highway that runs along the plains instead of the mountainous areas.

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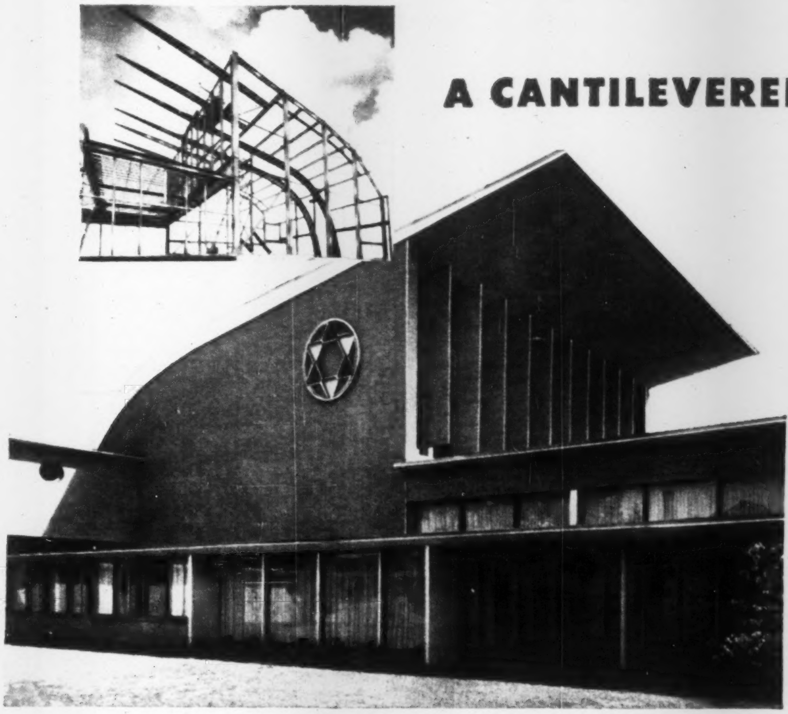

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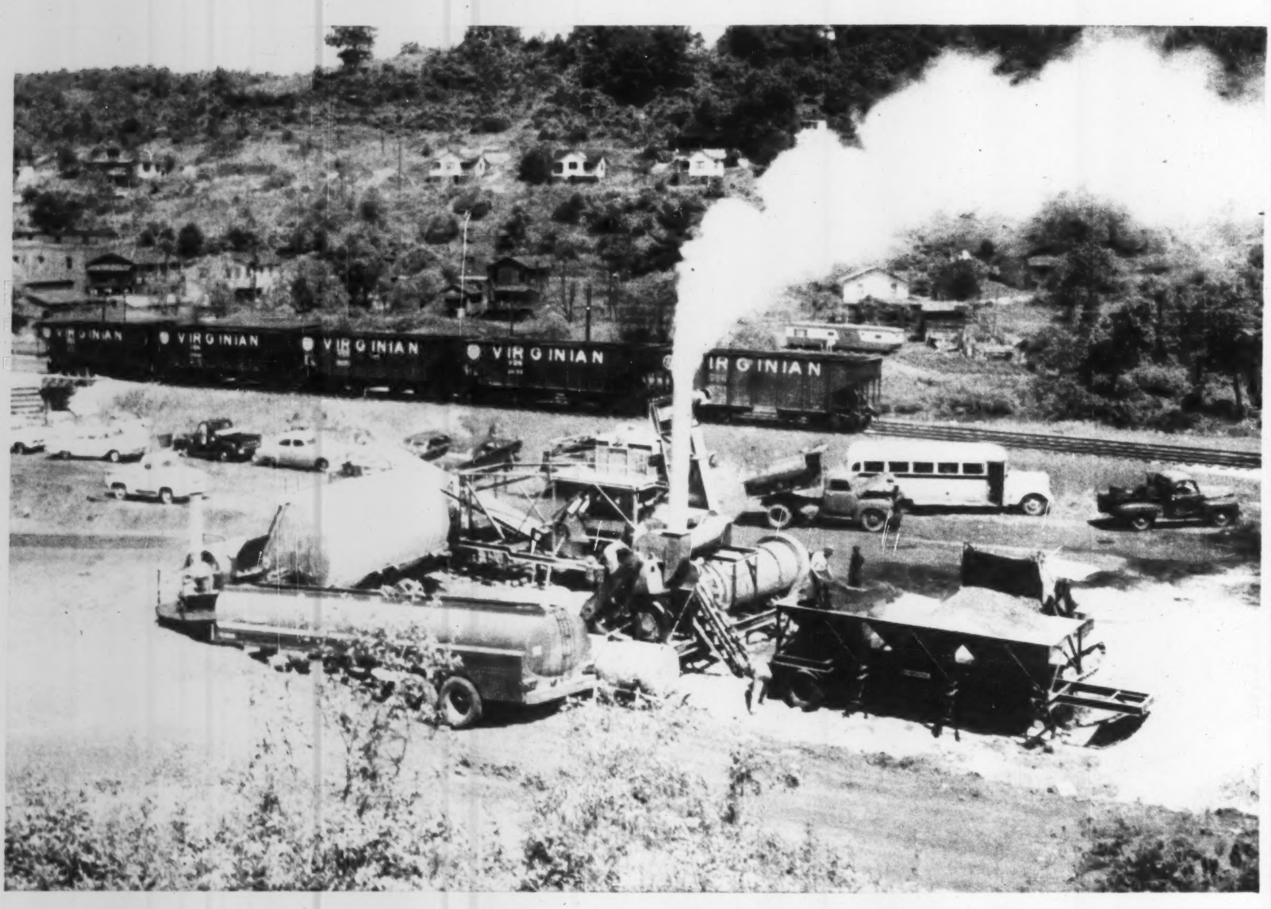

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Also available in the H&B series of complete wheel mounted batch type plants are Mobile 40 (120 to 140 tons per hour) and Mobile 60 (160 to 225 tons per hour). Bulletin M-57 will be sent on request.

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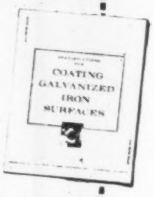

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Research

Roads From Coal

Binder material is made from soft coal deposits

A bituminous road-paving material made from soft coal has been developed by Curtiss-Wright Corp., N. J. Pennsylvania, with its distressed coal areas, is showing great interest in the material.

The binding material comes in liquid form. A typical road would contain these proportions: base course—75% limestone coarse aggregate, 25% coal products; binder course—95.5% limestone aggregate, 4.5% coal products; wearing course—94% limestone aggregate, 6% coal products; shoulder—50% coarse fill, 50% coal products.

It would take about 2,200 tons of coal for every mile of two-lane highway.

Curtiss-Wright says its new binder material will stand up four times longer than present asphalt surfaces under standard soaking conditions, have better self-healing properties for damage caused by extreme temperature changes, and support up to 30% greater loads without deformation.

The liquid binder can be processed in regular hot-mix batch plants. Paving equipment is also conventional.

The company has proposed 12 test sections of highway in Pennsylvania. Legislators and officials are looking into the proposal.

The State of Kentucky has also expressed interest. Details are being worked out for test strips in the state.

Waste Water Study Aims For Nutrient Recovery

A two year study of municipal and industrial waste water to determine what nutrients can be reclaimed as animal food will be undertaken by Northwestern University. The study will be financed by a $19,000 grant made by the National Institute of Health of the U. S. Department of Health, Welfare, and Education.

Chief purpose of the study is to learn more about organic compounds that specifically affect one-celled green algae. Growth of the algae is essential to the reclamation process. The main approach will be to learn what organic compounds are present in fresh sewage and in sewage after aerobic treatment.

The program will be under the supervision of Harold B. Gotaas, dean of the University's Technological Institute, who holds a patent for a method of producing animal fodder from municipal wastes.

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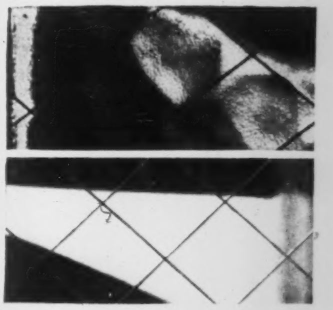

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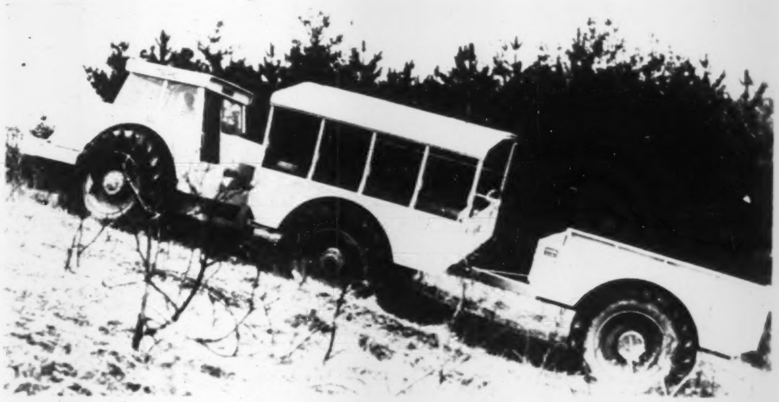


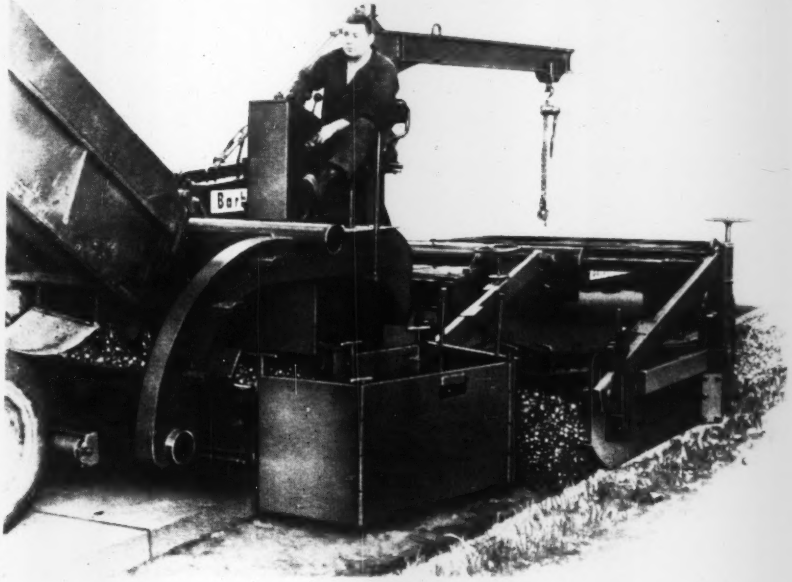
Exploration Tractor Pivots to Turn

Michigan's 16-man exploration tractor turns by pivoting in the middle. Hydraulic cylinders push the front half away from the back. This allows the machine to dodge trees and make a circle in less than its own 21-ft (without trailer) length.

The Model 75 seats 4 men in the operator's cab and 12 in the trunnion-connected main body. A three-ton capacity trailer tacks on to the back.

The 110-hp rig has four-wheel drive and a top speed of 29.6 mph. A 15,000 lb-capacity winch helps it through difficult terrain; high axles pass over stumps and rough spots.

Windows are made of tempered glass to resist swinging branches. Clark Equipment Co., Benton Harbor, Mich.



Versatile Unit for Widening Roads

Barber-Greene's SJ-50 road widener is engineered for all types of road-widening jobs and all kinds of mixes, including soil, concrete, asphalt, stone and stabilized materials.

The rig consists of a tractor and trailer. The tractor carries the operator's deck, power unit, drive wheels, receiving hopper and discharge conveyor.

The trailer is equipped with a jib-hoist to support the widening attachments. Since the weight of the laying attachments is borne by the hoist, the effect of side drag on steering is kept to a minimum.

During operation, the tractor acts as a power-steering axle for the tractor-trailer combination. The tractor is attached to the trailer by a fifth-wheel kingpin and by hydraulic rams that provide a positive steering force.

The front of the tractor is fitted with an oscillating push bar and rollers. This is to minimize the effects resulting from improper alignment with the supply truck.

Attachments for stone, soil and other stabilized materials can lay down widths of from 1 to 10 ft. Width can be varied hydraulically during the operation.

A slip-form attachment for concrete widening lays down strips from 1 to 5 ft wide. It comes with electric vibrators and oscillating screed.

Automatic leveling, thickness control and tamper compaction are features of the asphalt-widening attachment. It provides widths of from 3 ft to 6 ft, in 3-in. increments. Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill.

Portable Twin Arc-Welder Comes Set for Operation

A portable twin arc-welder uses the Cat D311 Series H diesel engine and two Lincoln Electric welding generators. It comes either with skid base or running gear.

The generators each have a rating (NEMA) of 300 amps at 40 v for simultaneous operation of two arcs. For parallel operation the arc-welder is rated at 600 amps, 40 v.

Current range of each generator is 60 to 375 amps.

Other than cables, fuel and water, the welder is delivered ready for operation. Engine Div., Caterpillar Tractor Co., Peoria, Ill.

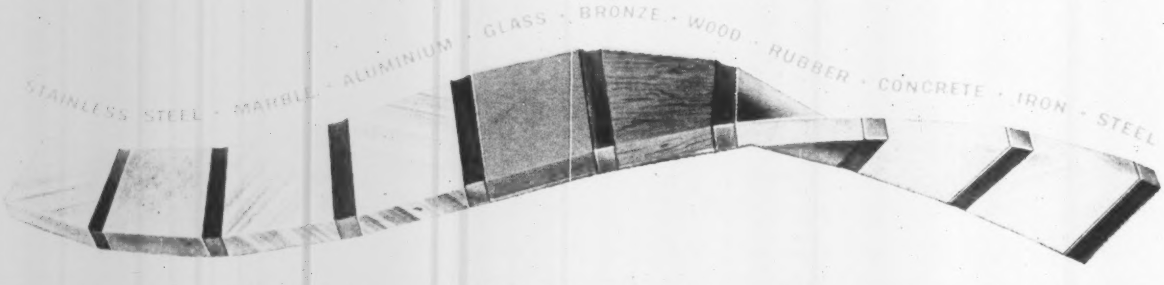
Bituminous Paver Fits Into Tight Spots

The Model AS bituminous paver can fit anywhere a truck can drive, the manufacturer states. It is available in 8-, 9- and 10-ft widths, with capacities up to 1¼ cu yd.

An adjustable, full-floating screed permits concave or convex surfaces up to 1½-in. crown. The paver can be equipped with a heated screed to pave both hot and cold mixes. Highway Equipment Co., Dept. H24-3, 616 D Ave. N.W., Cedar Rapids, Iowa.

(New *Products continued p.* 141)

Here's a multi-material sealant that rubber welds curtain walls, glass enclosures, store fronts, gas stations, roofs, copings, flashings, expansion joints, mullions, sidewalks, flooring, pipe joints and passages, air conditioning ducts and units.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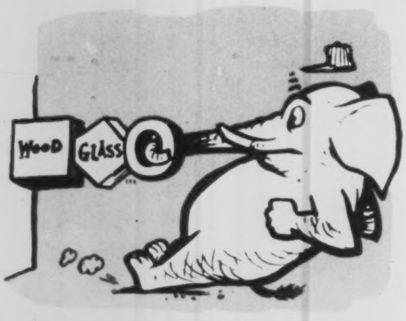
THE "ADHERENTLY" DIFFERENT SEALANT

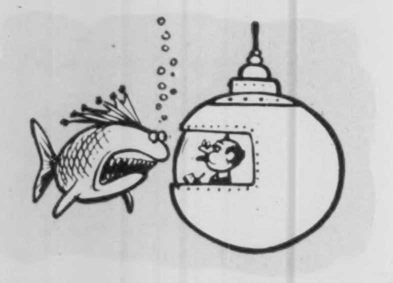
based on THIOKOL liquid polymers



Adhesion makes the difference. Bonds to practically all building materials. Will not flow from joints under heat, stress, or traffic.

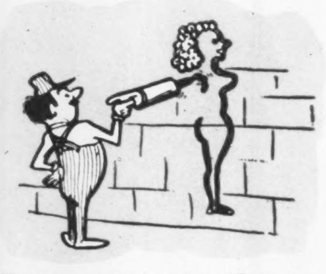
Elasticity makes the difference. Gives with building motion. Expands, contracts as structure demands. Cushions against vibration. Absorbs shock.

Longevity makes the difference. Properly formulated and applied, THIOKOL liquid polymer base sealants last for years. No costly, frequent maintenance.



Custom-sealing makes the difference. A true and lasting seal formed on the job – for each job and condition. No gasketing, cutting, splicing.

Excellent resistance to all elements makes the difference. Withstands air, moisture, wind, rain, sun, temperature extremes, oil, chemicals, solvents.



Application ease makes the difference. Applied by caulking gun. Tooled and packed in joint easily. Cures in place to durable seal. No leaks. No dryout.

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Available in various sizes, this . . .

Plant Screens as It Loads

The Model PS-70 portable screening plant screens as it loads to produce sized aggregate for all types of construction.

The plant consists of a vibrating screen, portable belt conveyor, reciprocating feeder and hopper or trap for feeding.

The screen folds under the conveyor for travel, and the unit can be towed from job to job without disassembling it.

A head-pulley clutch at the head-end of the conveyor controls feeder and conveyor but allows the screen to operate continuously.

The conveyor is raised into operating position by a hand hydraulic jack on the V-type truck. Push-arms from the conveyor truss support the screen. Screen angle is adjustable to regulate capacity and accommodate various truck heights.

A gasoline engine drives the rig by means of V-belts to the first and second countershaft and chain drive to conveyor headshaft.

The plants are available in various sizes to fit different screening requirements, the maker states. Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill.

Bin Holds 80 Tons of Aggregates

A four-compartment portable bin has a storage capacity of 80 tons of aggregates for hot-mix asphalt plants.

The two forward compartments have independent belt feeders that discharge on to the main conveyor belt. The third and fourth hoppers discharge their loads on to the same belt through adjustable gates. Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles 58, Calif.

(New Products continued p. 142)

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- ☐ #775 — KARRI-MORE BEAM AND GIRDER
- ☐ #800 — STOCK STEEL MOMENT CONTOUR BEAM AND GIRDER
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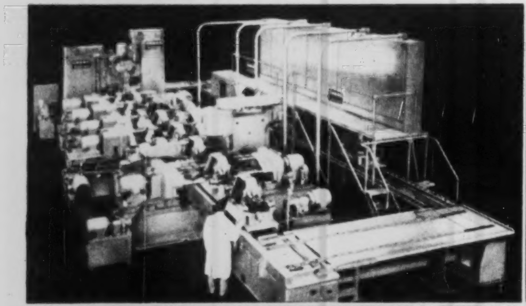
-the amazing liquid bonding agent!

Produces substantial savings for Eaton Manufacturing Company

The Problem: To install two 75-ton 25′ x 67′ milling and drilling machines on concrete floor of Cleveland plant. Machine had to rest on piers rather than floor itself, and forms required for single pour of these mounts were extremely expensive.

Weld-Crete the Answer: Weld-Crete was brushed on 36″ thick base floor at spots where 80 piers were to be located. With the simplest of forms, these 8″ thick piers were later poured with assurance of a permanent bond to the base. The $650,000 machines have operated on these mounts for over three years.



75-ton machine mounted upon 80 concrete piers permanently bonded by Weld-Crete to concrete floor base.

Shows some of 80 piers bonded to concrete base by Weld-Crete. Simple bonding replaced complicated forming, resulted in appreciable savings in installation of 75-ton machines shown above.

Whether you're installing new equipment, moving old, or repairing floors . . . Weld-Crete enables you to *permanently* bond new concrete *directly* to old . . or *any* sound surface. No costly, time-taking chipping, drilling, roughening, acid washing or scarifying of concrete base. When used with quick setting cement topping, you can lay new floors, ramps, driveways, etc., and run heavy truck traffic over them the next day. The insurance of a permanent bond with Weld-Crete costs as little as 4c per square foot! Get fact-packed literature about Weld-Crete from your Weld-Crete dealer, see Sweet's File, or write us direct.

The use of Weld-Crete is protected by U. S. Patent 2,760,885

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Bulk-Haul Tank Trailer Unloads Cement in Pipes

A bulk haul tank-trailer capable of pumping cement a distance of 105 ft has a discharge rate of the tank is 3:33 barrels per minute through a 4-in. hose. At 11 lb pressure, cement is pneumatically conveyed 20 ft horizontally and 85 ft vertically.

Pneumatic unloading is accomplished with a blower mounted on the tractor and connected to the power take-off shaft. The tank has a capacity of 105 to 120 barrels. Fruehauf Trailer Co., 10940 Harper, Detroit 32, Mich.

Briefs . . .

- **Lever hoist**—A lever hoist that features sideways rigidity in the handle is available in ½-ton, ¾-ton, 1-ton and 1½-ton capacity. Control of lifting or lowering is governed by a knob on the lever bar of the handle. The hoists have heavy aluminum blocks with malleable hooks. Thern Machine Co., 5700 W. Fourth St., Winona, Minn.

- **Welder and power plants**—A series of gasoline engine drive welder and power plants is now offered with optional electric starters. The new system is powered by a 12-volt battery with Bendix drive automotive type starter. The plant delivers 225 amp. AC welding current on 100% duty cycle. Miller Electric Manufacturing Co., Inc., Appleton, Wis.

- **Manual control valves**—a new line of handwheel-operated control valves designated as Series LM is now available in sizes from ½ in. through 6 in. The valve body walls are cast to 600 lb. ASA rating. The valves are available in ductile iron, steel, bronze, and other alloys. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.

- **Resin lining for pipe** concrete and metal pipelines can be reconditioned in place with a liner of acid-resistant epoxy resin. The material is applied centrifugally by machines that go through pipe from 24 in. to 144 in. in diameter. Centriline Corp., 140 Cedar St., New York 6, N.Y.

- **Self-unloading trailer**—Dry granular materials can be unloaded at the rate of one ton per minute from a Bulkmaster FB-T bulk transport unit. Standard body lengths are in 20 ft to 36 ft. in 4-ft increments. The trailer comes in single or tandem axles. Dorsey Trailers, 401 Hickman, Elba, Ala.

Pretty soft for the operator

Le Roi Shock-Absorbing Breakers

The next best thing to having somebody else break concrete for you is to equip your men with Le Roi shock-absorbing breakers!

The handles of these remarkable tools float on a rubber cushion, cutting out 65% of the rib-rattling, head-hammering jolts your men now get — yet there's no loss of powerful punch down at the point!

Happier workers mean heftier output, so Le Roi gives you rubber handles for cooler gripping . . . exhaust is directed *away* from the operator . . . swivel-type air connections allow easy maneuvering . . . and latch-type retainers simplify tool changes. All this, and 65% less "kick," too! See your Le Roi distributor, or write: Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wis.

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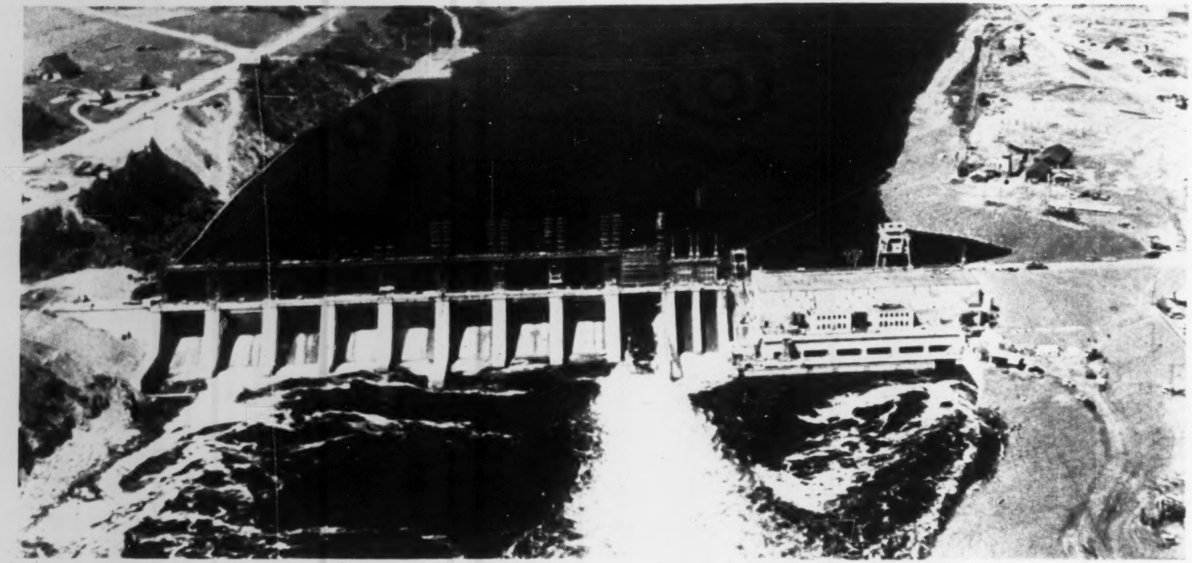
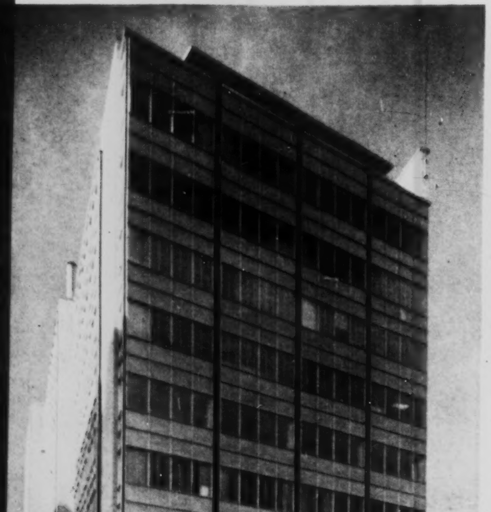
Business Profile

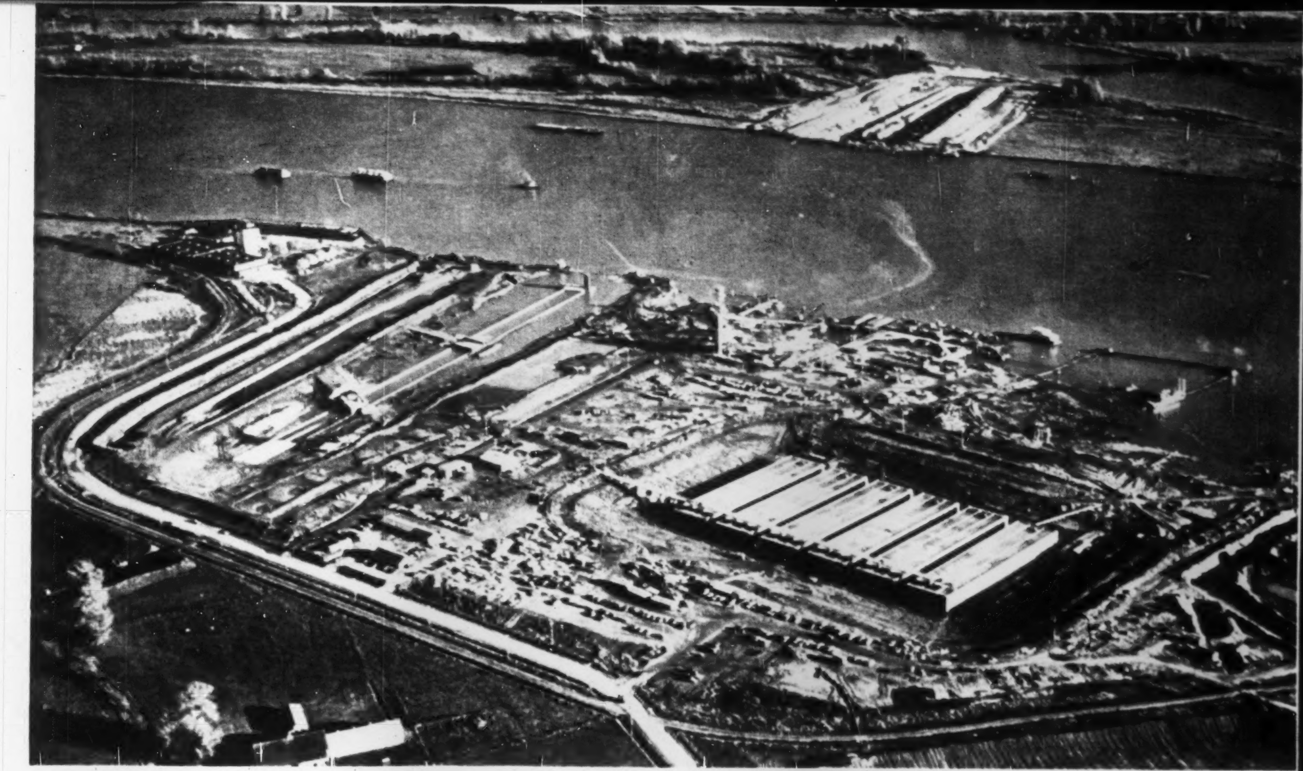


New Brunswick—The company built a hydroelectric plant in the St. John River in 1957.

Canada's 'Biggest' Thrives on



Ontario—a 1958 office building. Quebec—Place Ville Marie, 1959's big job.



British Columbia—Deas Island tunnel sections are built in drydock, floated, sunk in place.

Versatility

Name a major construction project under way in Canada and chances are that Foundation Co. of Canada Ltd. is taking part in it.

Its annual report lists some 100 projects in all sections of Canada among the large jobs done during the year. These include schools, steel plants, office buildings, factories, harbor installations, airports, highways, hydroelectric plants and microwave relay towers.

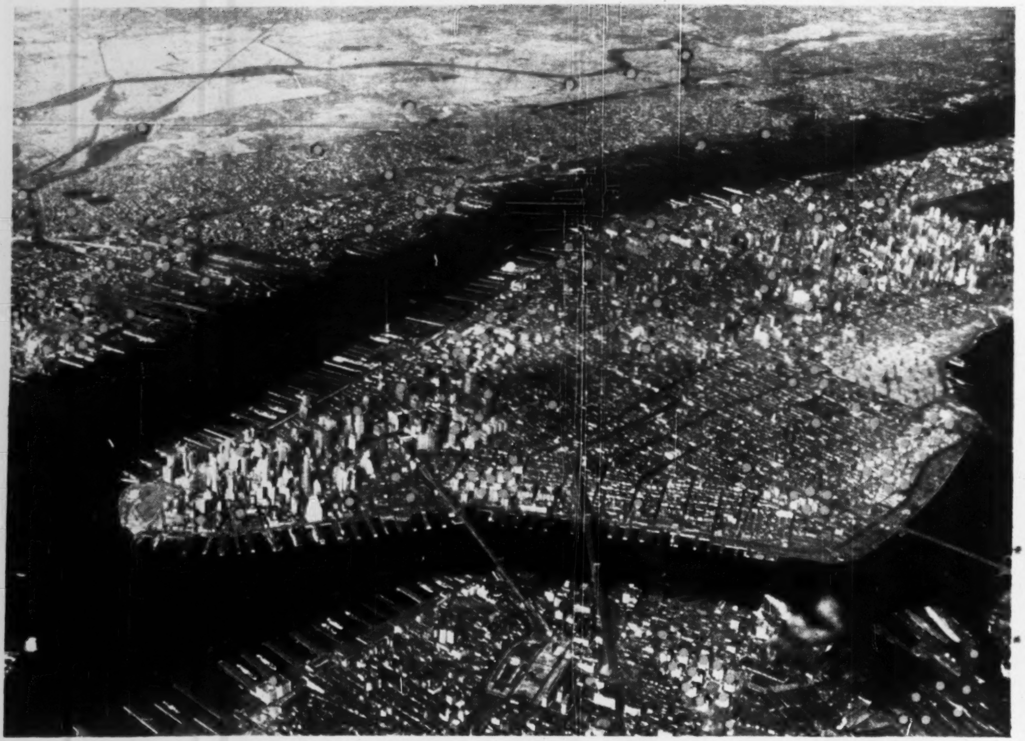
Soon Foundation Co. will begin work on the largest commercial buildings project in Canadian history. To be known as Place Ville Marie, it will be a Rockefeller Center-type group of buildings in downtown Montreal. The development will include the tallest office structure in the entire British Commonwealth, a 42-story, cruciform, glass-walled skyscraper.

In recent years Foundation Co. has handled almost every kind of large construction project. It has also insulated a church organ loft and repaired the sea wall of a coastal divinity college.

It's the largest construction company in Canada. Gross volume last year was approximately $200 million.

• **Born in New York**—The concern originated in New York in 1910 as the Foundation Co. It specialized in compressed-air caisson work on the founda-

TOP MEN AT FOUNDATION CO. are, Board Chairman Rutley (left), President McGowan and Executive Vice President Shaw (standing).



NEW YORK *1900 Structures rest on Raymond Foundations*

RAYMOND
helps support
THE SKYLINE OF AMERICA

WASHINGTON *276 Structures rest on Raymond Foundations*

BOSTON *81 Structures rest on Raymond Foundations*

Photos by
Fairchild Aerial Surveys, Inc.

SAN FRANCISCO *565 Structures rest on Raymond Foundations*

[illegible] *130 Structures
rest on
Raymond
Foundations*

ATLANTA *75 Structures rest on Raymond Foundations*

NEW ORLEANS
*217 Structures
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JUTTING INTO THE SKIES OF AMERICA are over 15,000 structures built on Raymond foundations. They include giant industrial plants, skyscrapers, small office buildings, highways and bridges, monuments and harbor facilities—construction of every size and description.

Our services include soil investigations, pile manufacture, pile driving and load testing. All these are part of the complete Raymond operation, and we are the only company to offer this full range of services. So, if there is construction in your future, give Raymond an outline of your requirements. Call on either our main office or any branch.

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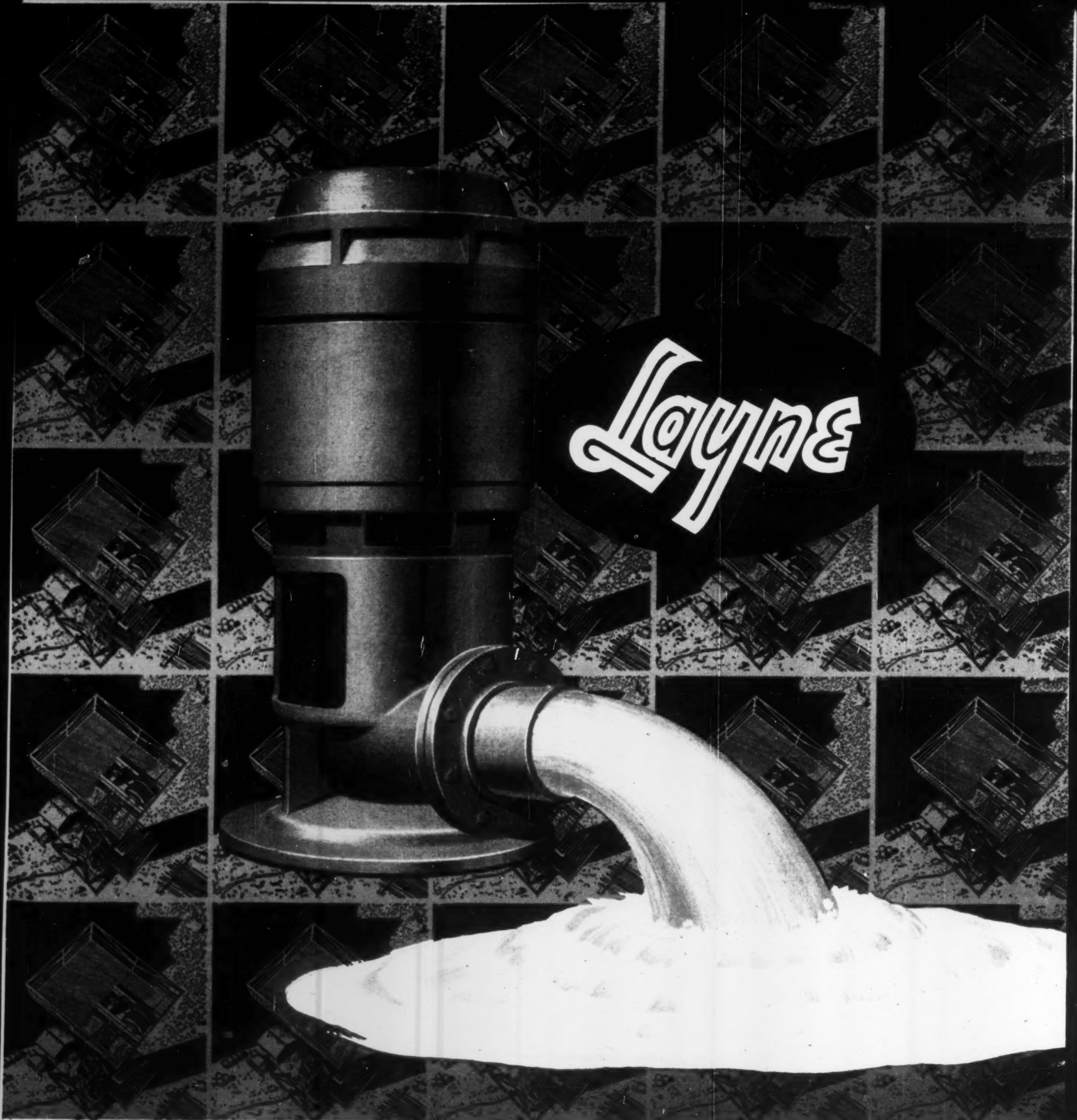
PHILADELPHIA *347 Structures rest on Raymond Foundations*

TORONTO *46 Structures rest on Raymond Foundations*



Layne pumps top more producing water wells

Layne Pump Design, manufacture and installation are only part of the complete water service offered by the Layne organization. Other services include: Initial surveys, explorations, recommendations, site selection, foundation and soil sampling, well drilling, well casings and screens, gravel wall wells, construction of water systems, complete research staff and facilities, maintenance and service, chemical treatment of water wells, water treatment. *Write for Bulletin No. 100.*

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tions for skyscrapers in lower Manhattan. An energetic, young Canadian engineer, Richard Ellard Chadwick, joined Foundation Co. in 1911 and in the same year he was appointed chief engineer of its new Montreal office. By 1919 he was general manager of the Canadian operation.

In 1924 Mr. Chadwick persuaded the directors in New York to form a Canadian company with Canadian shareholders. A group of Montreal financiers, headed by V. M. Drury, then president of Canadian Car & Foundry Co. Ltd., bought shares in the company. Five years later they bought a controlling interest in Foundation Co. Ltd. of Canada and it became a Canadian-owned firm.

Today there is no connection between Foundation Co. of Canada and the original Foundation Co., which is still in business in New York City.

• A builder of Canada—The construction of a theater for the Stratford (Ontario) Shakespearean Festival organization exemplifies the role of Foundation Co. in Canadian life.

In 1956 the dramatic group decided to replace its tent theater with a permanent structure. Foundation Co. offered to build a theater at cost and a profit of $1 as its contribution to the nation's cultural life.

Like many of the company's projects, the theater was unusual and difficult.

The structure, erected at a cost of $1.5 million, is a theater-in-the-round on two levels.

It had to be built in only 276 days in between the closing of the tent theater and the scheduled opening of the theater-in-the-round.

Foundation Co. workmen placed concrete, even for the roof bays, during the winter months in temperatures as low as −40F. But the job was finished on time for the first performance of the 1957 season (ENR June 27, 1957, p. 90).

• From caissons on up—In its early days, Foundation Co. of Canada followed the lead of the parent company in New York and specialized in compressed-air caisson work. After World War I the firm began to build hydroelectric power developments and facilities for Canada's fast-growing mining and pulp and paper industries. From this, operations expanded to include most major fields of Canadian endeavor.

The company's ability to put in foundations under extremely difficult conditions brought it some of Canada's toughest engineering and construction jobs. One of these was the reconstruction of West Side Harbor ocean terminals at St. John's, Newfoundland, following the disastrous fire there in 1931. Foundation Co. did the job in 4½ months, working in water with a 28-ft tidal variation.

FOUNDER R. C. CHADWICK, retired, serves the company as a consultant.

In the Strait of Canso, which divides Cape Breton Island from the rest of the province of Nova Scotia, the company's crews made rock borings for a bridge despite tidal currents and Atlantic storms. At Port Alfred, Quebec, on the Saguenay River, the company designed and built the 1,138-ft Powell Wharf, the first Canadian wharf on steel H piles.

During World War II the company's principal projects were an aluminum processing plant in Arvida, Quebec; the giant Shipshaw hydroelectric power plant installation for that aluminum producer and the construction and maintenance of anti-submarine systems in Sydney and Halifax, Nova Scotia.

• Branching out—As Foundation Co. of Canada grew in importance and achieved greater versatility, it began to expand its organization. The firm's early specialization in marine operations led to the formation, in 1928, of the first of its ten subsidiaries, Foundation Maritime Ltd. This branch does ship docking and operates a fleet of marine salvage tugboats and heavy-lift derrick boats.

"The company is made up of a number of divisions and an assortment of subsidiaries, all of them closely allied and always within the orbit of the industry as a whole," says Lionel James McGowan, president and general manager.

"The main company, which among ourselves we call the Canada Company, operates a construction company in addition to directing its subsidiaries. Generally speaking, it will do most branches of construction, with the exception of roads, airports and pipeline work.

"Foundation of Canada Engineering Corp., which we call FENCO, is an entirely professional group," Mr. McGowan says. "There we have designing engineers, research and development engineers and the management engineers of the many projects that this group now has under way."

Two of FENCO's most impressive projects are the Burlington Skyway, the longest highway bridge in Canada, and the Deas Island vehicular tunnel, near Vancouver.

The Burlington Skyway is on the Queen Elizabeth Way, between Hamilton and Niagara Falls, Ontario. It is 8,400 ft long, cost $16 million to build.

For the Deas Island tunnel, FENCO engineers are building twin tube sections of reinforced concrete in drydock. These sections, weighing 25,000 tons each, will be floated into position, submerged, and joined under water.

"We have a company that we call Geocon Ltd.," Mr. McGowan continued. "This company has a group of soils engineers who make laboratory tests.

"Then we have three companies that specialize in construction machinery. Construction Equipment Co. Ltd., of Montreal, is the largest house of its kind in Canada, with yards and offices from Halifax to Vancouver. We have Atlantic Tug & Equipment Co. Ltd., with its head offices in Syracuse, N. Y., and the third is National Materials Handling Ltd., in Edmonton, Alberta. They buy, sell, rent, repair, service and plan equipment."

In the past four years, Foundation Co. has formed two international companies. Construction Dominico-Canadiense does all types of construction and engineering services in the Dominican Republic. Chemiebau Canada Ltd. builds chemical plants in Canada for the patented processes of a German firm, Chemiebau, Dr. A. Zieren, G.m.b.H.

Because of the great amount of construction work the main company did in Ontario, a separate company, Foundation Co. of Ontario Ltd., was formed in 1930. Last year, Foundation Co. of Quebec Ltd. was formed in Montreal.

• Men of broad experience—Like most of the executives of Foundation Co., Mr. McGowan has had experience in most phases of construction work. His first building job was with the Austin Co., which was erecting a wooden-match factory near Montreal, when he was 18. Later, he joined Thompson-Starrett Co. and worked in New York and

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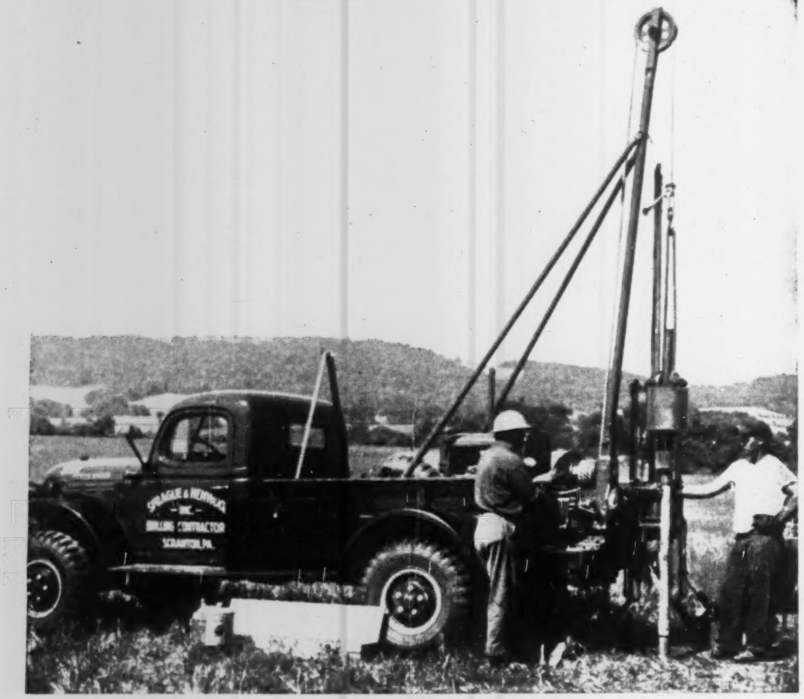

A Sprague & Henwood Drill Crew Recovering Soil Samples For A Highway Relocation Project

The lasting success of any construction project depends on the design of a proper foundation; and the design, in turn, depends on an adequate knowledge of the sub-surface soil and rock.

Sprague & Henwood's unbeatable team of experienced drill crews, modern equipment, and expert supervision is your assurance that the soil samples and rock cores recovered will be the best obtainable under the conditions that prevail. The structures of tomorrow are only as good as they are designed today, based upon a complete, accurate, and dependable sub-surface study.

Behind Sprague & Henwood's drilling and supervisory personnel is 75 years of accumulated knowledge and experience, gained from completing thousands of successful drilling contracts, under every conceivable condition.

The equipment used is first-quality and of the proper type. It is built in Sprague & Henwood's own plant, and is "field-tested" prior to being put into general use to insure customer satisfaction and completion of the job in the shortest possible time.

Crews and adequate equipment are located throughout the United States. Other services include grout-hole and blast-hole drilling and pressure grouting.

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Chicago. He studied at the University of Chicago in his free time.

Laid off during the depression, Mr. McGowan returned to Canada and, a short time later, joined Foundation Co. He became manager of Foundation Co. of Ontario Ltd. in 1940 and moved rapidly up the ladder to the presidency of the parent company.

R. C. Rutley, chairman of the board, joined the firm in 1914 as a resident engineer. After service overseas during World War I, he rejoined the company as a superintendent. He served subsequently as purchasing agent, secretary, assistant to the general manager, assistant general manager and general manager.

W. F. Hickey, vice-president and chief engineer of Foundation Co., joined the firm in 1946 after service in the Royal Canadian Engineers in World War II. He worked as a supervisor of structural design, district engineer and director of the Toronto office.

• March to the North—Because of its ability to handle construction work in remote and frigid areas, Foundation Co. has been one of the leaders of Canada's industrial march to the north.

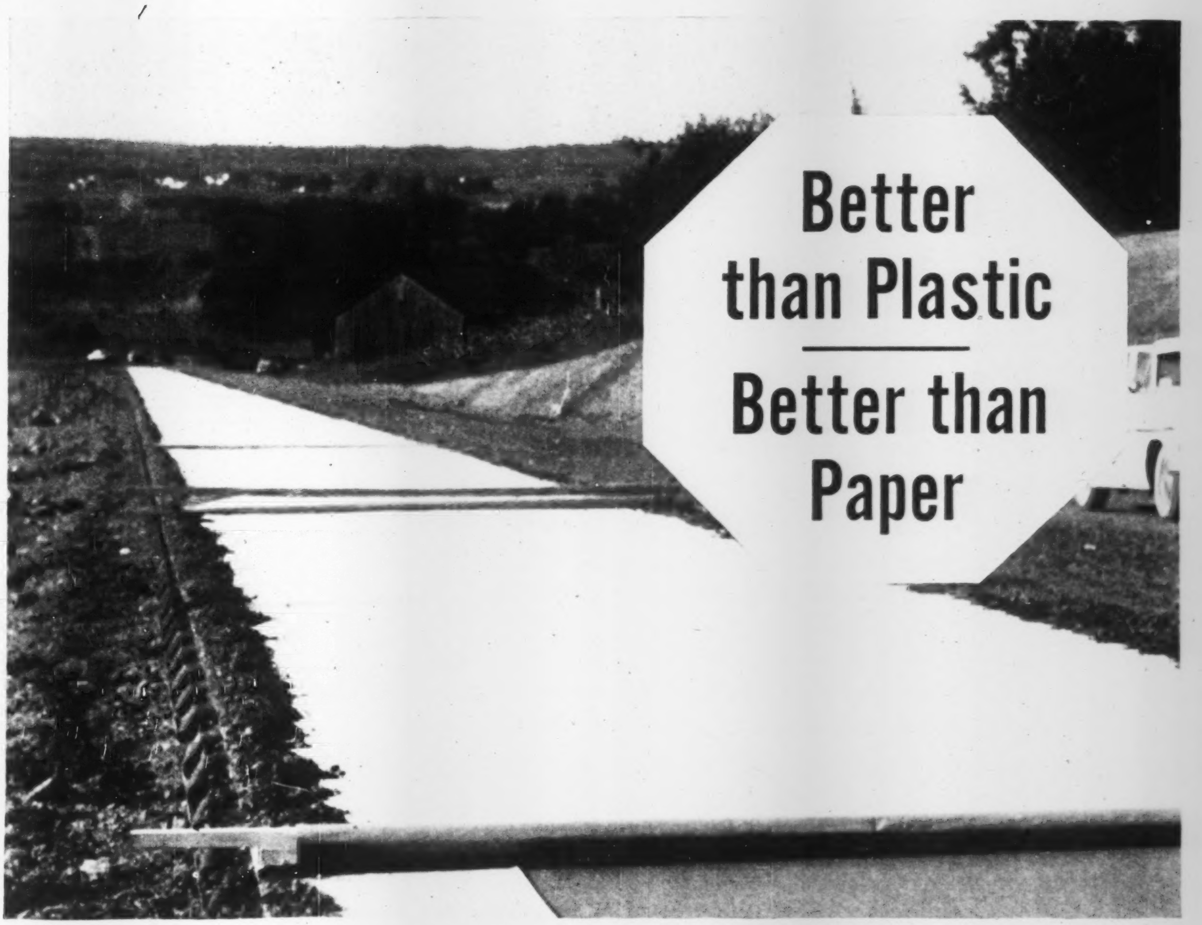
At Anticosti Island, at the mouth of the St. Lawrence River, Foundation Co. constructed a pulpwood loading plant with a wharf and power and housing developments during winter weather.

Probably the ultimate in the company's cold-weather jobs was the commission to install the eastern portion of the Distant Early Warning radar line in the Canadian Arctic. It took more than 3,000 men three years to complete the project. Some 81,000 tons of material and equipment were shipped by air and sea to the crews.

Another out-of-the-way project, one still under construction, is a $10-million hydroelectric power plant in Quebec, 200 miles north of the St. Lawrence River, for a new iron ore development.

In northern Manitoba, Foundation Co. is at work on a $175-million nickel-mining and smelting development at Thompson for International Nickel. There, 850 miles north of Winnipeg by rail, an entire townsite and mining plant with its own power development is being created. Foundation Company's share of the project is estimated at $70 million. Before a 34-mile railway spur was built, tractor-drawn sleds brought in 28,000 tons of freight so that construction could get under way in the winter of 1956-1957.

• No fear of the Arctic—"The Arctic is tough, but no longer frightening."



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Here is a major contribution to better and lower cost curing of concrete for highways. Now, for the first time, you can have, combined in one product, the best features of paper curing and plastic curing, *and at no additional cost.*

New Sisalkraft plastic-coated paper permits *controlled,* "automatic" curing; provides the best, most practical cure possible at minimum cost.

The reflective plastic coat reduces temperature fluctuation in the slab to help produce abrasion resistant, water-tight, durable concrete.

Want to cut costs? You'll find Sisalkraft far outlasts both ordinary paper and flimsy plastic. Write for further facts to American Sisalkraft Corporation, Attleboro, Massachusetts.

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reinforced paper, foil and plastics for construction, industrial packaging and agriculture

8 out of 10 Sanitary Engineers assure

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flexible GASKETS

There are more TYLOX Rubber and Neoprene Gaskets in low head service than all other types of gaskets combined! . . . Most waste disposal designers specify TYLOX Gaskets, knowing from experience that they prevent water from leaking *in* or *out* of pipe joints. The diagram below of a TYLOX Type "A" Gasket on straight T & G pipe shows how . . .

Whether you are planning pipe lines of B & S, T & G, offset or recessed pipe of *any* size, there's a Tylox Rubber or Neoprene Gasket in the Hamilton Kent family of true compression Gaskets to make the joints water-tight for the life of the pipe itself. If you are not already thoroughly familiar with the advantages of TYLOX Gaskets, write for full information and engineering details.

TYLOX prevents joint leakage with a compression-tight seal. It reduces pipe-laying costs with quick assembly and fast pipe coupling. Acid-resistant, TYLOX never deteriorates.

This TYLOX GASKETED PIPE is being used on the following sewer installation:

PROJECT: West Side Trunk Sewer, West Side Sanitary District, County of Onondaga, New York, Onondaga Public Works Commission.

ENGINEERS: O'Brien & Gere, Consulting Engineers, Syracuse, N. Y.

CONTRACTOR: M. A. Bongiovanni, Inc., Syracuse, N. Y.

PIPE: Reinforced Concrete T & G Pipe, Manufactured by American-Marietta Company, Concrete Products Division, Syracuse District, Syracuse, N. Y.

HAMILTON KENT
MANUFACTURING COMPANY
KENT, OHIO
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5133

CANADIAN PLANT: 10 Brussels St., New Toronto, Ont., Phone CLifford 1-2494 says R. E. Shaw, executive vice president, who has worked in India, as well as the far north. "Modern transport, communications, food-processing and construction equipment have brought the Arctic within reach of government and industry. The development of the Arctic began with the construction of the DEW line. In my opinion, the development of the great natural resources of the far north will follow."

A new set of construction techniques will have to be learned for the northern areas, Mr. Shaw says.

"If we are to solve the climate problem, we will have to learn to work in a land where the summer construction season begins in May and ends in October, but where ships cannot get in until August and must leave within two months.

"We will have to learn to fly to ice strips that form in December and go out in May, and to live in isolation during the spring thaw and the fall freeze-up. We must learn to stockpile our gravel in the summer and haul it over frozen ground and ice during the winter. We'll have to be able to found our structures and work out equipment in permafrost areas where the ground is solidly frozen all year, except for the top layer, which become a quagmire in summer. In the winter we will have to live and work in high winds and temperatures of −50 F. During the summer there will be dense clouds of bugs.

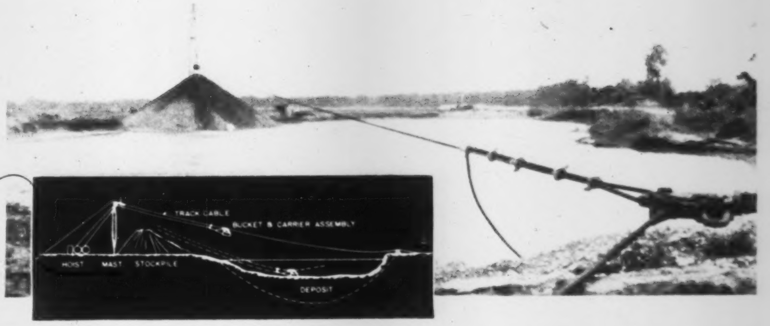
"The Arctic builder must plant his cost against time in deciding how and when to ship materials, equipment and men," says Mr. Shaw. "For every ton of construction material to go in by air or by sea, it is necesary to ship in three tons of support, including fresh food.

"Packaging must be light and strong for airlifts, and rugged for protection against damage as sea cargo. Above all it must be packaged to be stored out of doors in winter months, because the cost of building warehouses in the Arctic is prohibitive."

• Now for the future—The future looks good to the top officials of Foundation Co. They forecast a busy construction industry with Canada's ever-northward expansion, heavy backlog of industrial and commercial construction in the major cities, and an increasing amount of residential work as Canada's population continues to grow rapidly.

They expect Foundation Co. of Canada Ltd. to obtain its share of the future projects, just as it has in the past.

To see how the Foundation Co. used production line techniques on one of its jobs, turn to page 73.



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Operating costs as low as 8¢ per yd. for labor, power and maintenance are reported by Slackline Cableway owners when digging free-caving material at average depth and haul distances.

These low costs are achieved by using just one machine—the new Sauerman Slackline Cableway. Multiple equipment is not needed to supply your required tonnage. For example, on an average haul and digging depth, a single medium size machine will charge a 200 tph. plant.

The high Slackline mast permits building a large pile which can supply plant demands through a plate feeder and tunnel conveyor, front-end loader or clamshell. The new Sauerman torque converter diesel-hoist automatically matches power to load demands and is designed for continuous duty. Fluid drive cushions out shock loads to reduce fuel and maintenance costs, extend cable life.

Increasing land values and depleting resources make it necessary to get all the material out of your deposit. You can do this with a Sauerman Slackline. The machine will dig from ground level to deep under water and keep your plant running additional years at the lowest possible operating cost. Several pits are now operating Slacklines on 1000-ft. spans with average hauls of 500 to 700 ft. and from 100-ft. depths.

Write or call, giving your tonnage requirements, depth and length of deposit—if available. We will promptly supply more information on Slackline Cableways, and show you how to *save with a Sauerman.*

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Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

One in a series of technical reports by Bower

BEARING BRIEFINGS

ROLLER GUIDANCE– VITAL FACTOR IN BEARING LIFE

Roller guidance has been established by the Anti-Friction Bearing Manufacturers Association as a major rating factor for roller bearings. There is a direct relationship between this factor and the life and capacity of a cylindrical roller bearing under load.

Figure 1 illustrates the results of a loose fit between a roller and the guiding ribs of the raceway. Because of lack of guidance by the ribs, the roller is free to skew and skid under load. Such a condition invariably leads to early bearing failure.

To achieve close roller fit and proper roller guidance, Bower precision grinds each bearing race on specially designed centerless grinders. In this operation, Bower positions the integral raceway ribs *from the theoretical centerline of the bearing*. This method produces bearings with high dimensional accuracy and perfect symmetry.

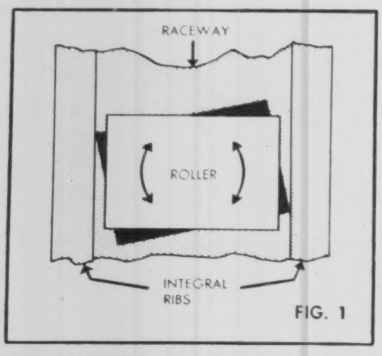

FIG. 1

Fig. 1. Loose fit in raceway means poor roller guidance. Roller can skew and skid under load.

In addition, the close tolerances held in grinding the roller track and integral guiding ribs give Bower cylindrical roller bearings the ability to *take thrust in any direction*. A Bower cylindrical roller bearing has thrust capacity of from 10-15% of its rated radial capacity!

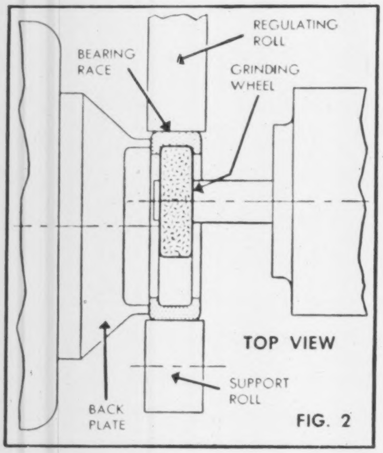

FIG. 2

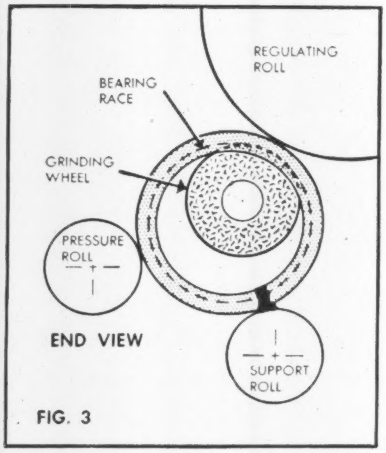

FIG. 3

Figures 2 and 3 diagram the centerless grinding method used to finish Bower raceways. Use of this technique assures not only optimum roller guidance and maximum bearing life, but also virtually eliminates bearing runout. BEARING SYMMETRY WHICH RESULTS FROM THIS TECHNIQUE PERMITS ACCURATE SHAFT LOCATION REGARDLESS OF HOW THE OUTER RACE AND ROLLER ASSEMBLY ARE INSTALLED. IT COMPLETELY ELIMINATES THE POSSIBILITY OF IMPROPER INSTALLATION.

★ ★ ★ ★

Whatever your bearing needs, we suggest you consider the advantages of Bower bearings. Where product design calls for tapered or cylindrical roller bearings or journal roller assemblies, Bower can provide them in a full range of types and sizes. Bower engineers are always available, should you desire assistance or advice on bearing applications.

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How You Can Write for Profit

Successful Technical Writing: Technical Articles, Papers, Reports, Instruction and Training Manuals and Books—By Tyler G. Hicks. 287 pages. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $5.50.

If you've never written anything about your work, this book will tell you how.

Even if you have written before, you can find in this volume many tips on how to improve your writing proficiency.

If there's any truth in the old slander that "engineers can't write," here's the way out for them.

Author Hicks is himself an engineer. He spent six years on the editorial staff of McGraw-Hill's Power and is now an editor of the McGraw-Hill Book Co. He has written hundreds of technical articles and three earlier books, including "Pump Operation and Maintenance."

In his preface, Tyler Hicks calls this "a practical, hard-hitting book stressing the how-to aspects of technical writing." It surely is just that!

Take these excerpts from his chapters on writing articles for publication, which compose almost half of his book:

"To succeed in technical writing you must present good ideas in clear language. . . . Technical writing is a powerful tool that you can use to advance in your field.

"Study a magazine before submitting material to it. . . . Train yourself to be on the lookout for article ideas every day on your job. . . . Never start an article until you are certain that your firm and supervisors approve of the subject, its handling, and the illustrations you will use.

"Outlining your articles before you write saves time, energy and labor. And the finished article has more chance of being accepted because it will have better continuity, will include important points.

"Working titles for your articles win readers. . . . Good titles often emphasize newness, or 'nowness.' Start with a label title and work it into an active, interest-catching one. Once you have a good title for your article, write the lead. . . . A snappy lead gets your reader into the article. To hold the reader you must keep the body of your article interesting. . . . Be concise, stick to your outline.

"Know your audience and purpose, develop your subject from the lead, cite cases and give examples, use illustrations, compare the new with the old, and cite advantages. . . . Weed out abstract words, do not be pompous or verbose, strive for unity, use action verbs, emphasize important ideas . . . make your conclusion clear. Use as short a conclusion as possible. Then stop writing.

"Illustrations often mean the difference between acceptance and rejection of an article. But more important, they help you tell your story better. . . . So choose your illustrations carefully . . . the article will get better readership.

"Write quickly—polish at your leisure. But write—and polish. . . . To polish an article, forget it for a while, then review it. Be as critical as you can while you reread it. . . . After you're satisfied your article is right, send it to the magazine you've chosen. Then be patient. Don't needle for acceptance, publication date, or payment."

From the magazine article, Mr. Hicks goes into instruction on how to do the engineering report, the technical paper, the instructional manual—and, finally, what he calls the ultimate challenge, the book.

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Electric Cranes—by H. H. Broughton. 511 pages. Messrs. E. & F. N. Spon Ltd., 15 Bedford St., Strand, London, W.C. 2, Eng.

Residential and Commercial Air Conditioning—by Charles H. Burkhardt. 324 pages. McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. $9.00.

Handbook of Industrial Loss Prevention—McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. $20.00.

Planning for Flood Damage Prevention—by Jerrod A. Moore. 61 pages. Publications Services, Engineering Experiment Station, Georgia Institute of Technology, Atlanta, Ga. $1.00.

1958 Book of ASTM Standards (Ten parts)—Part 1: Ferrous Metals Specifications, $12.00; Part 2: Non-Ferrous Metals Specifications, $10.00; Part 3: Methods of Test for Metals, $10.00; Part 4: Cement, Concrete, Mortars, Road Materials, Waterproofing, Soils, $12.00; Part 5: Masonry Products, Ceramics, Thermal Insulation, Sandwich and Building Constructions, Acoustical Materials, Fire Tests, $12.00; Part 6: Wood, Paper, Adhesives, Shipping Containers, Cellulose, Leather, $10.00; Part 7: Petroleum Products, Lubricants, Tank Measurements, Engine Tests, $12.00; Part 8: Paint, Naval Stores, Aromatic Hydrocarbons, Coal, Coke, Gaseous Fuels, Engine Antifreezes, $12.00; Part 9: Plastics, Electrical Insulation, Rubber, Carbon Black, $14.00; Part 10: Textiles, Soap, Water, Atmospheric Analysis, Wax Polishes,

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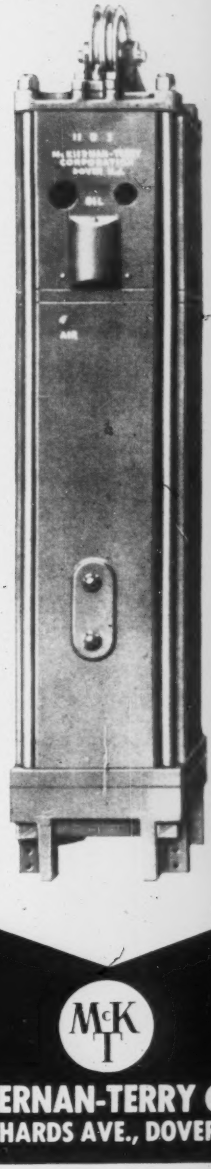

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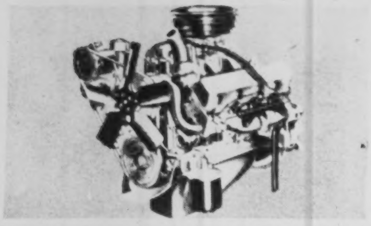

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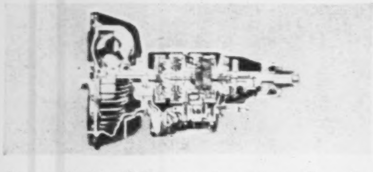

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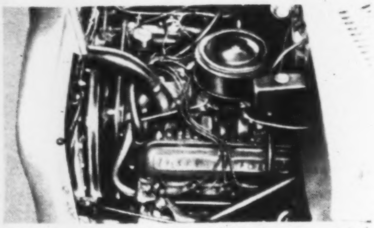

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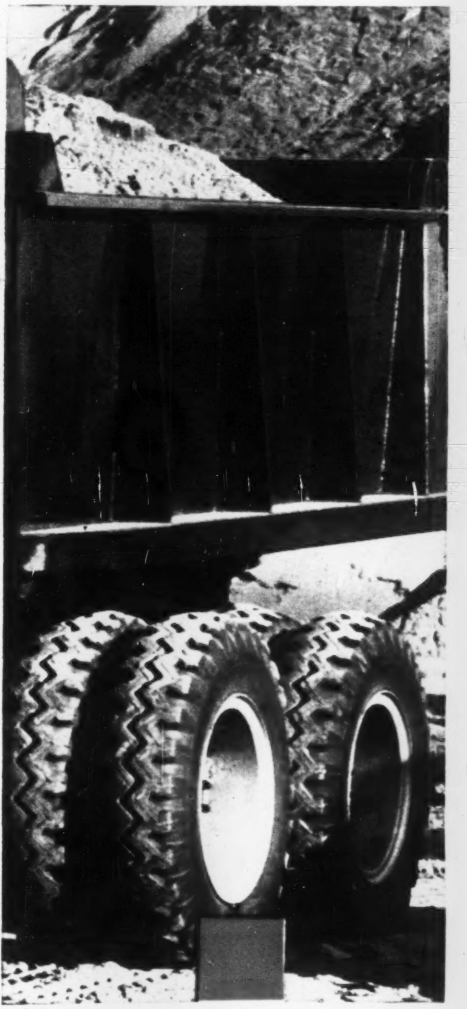

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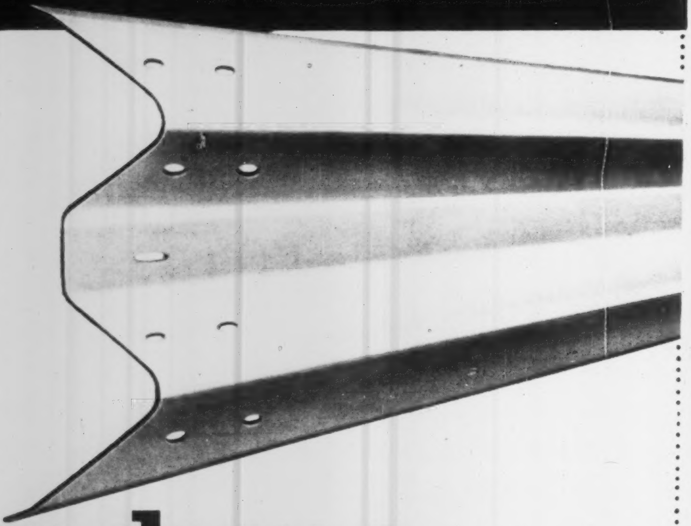

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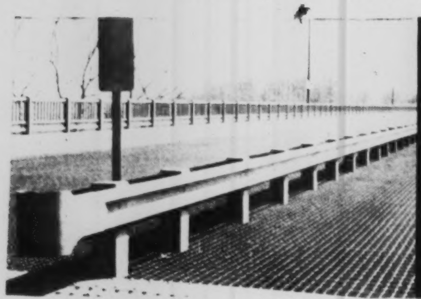

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THEORY OF BEAMS—by T. Iwinski. 85 pages. Pergamon Press Inc., 122 East 55th St., New York 22, N. Y. $3.50.

STATISTICAL THEORY OF IRREVERSIBLE PROCESSES—by R. Eisenschitz. 84 pages. Oxford University Press, 417 Fifth Ave., New York 16, N. Y. $2.00.

ADVANCED MECHANICS OF FLUIDS—444 pages. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $9.75.

THE SELECTION OF RETAIL LOCATIONS—by Richard L. Nelson. 422 pages. F. W. Dodge Corp., 119 West 40th St., New York 18, N. Y. $9.00.

THE POTENTIAL-THEORY OF UNSTEADY SUPERSONIC FLOW—by J. W. Miles. 220 pages. Cambridge University Press, 32 East 57th St., New York 22, N. Y. $8.50.

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BASIC GEOLOGY FOR SCIENCE AND ENGINEERING—by Edward C. Dapples. 609 pages. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $9.50.

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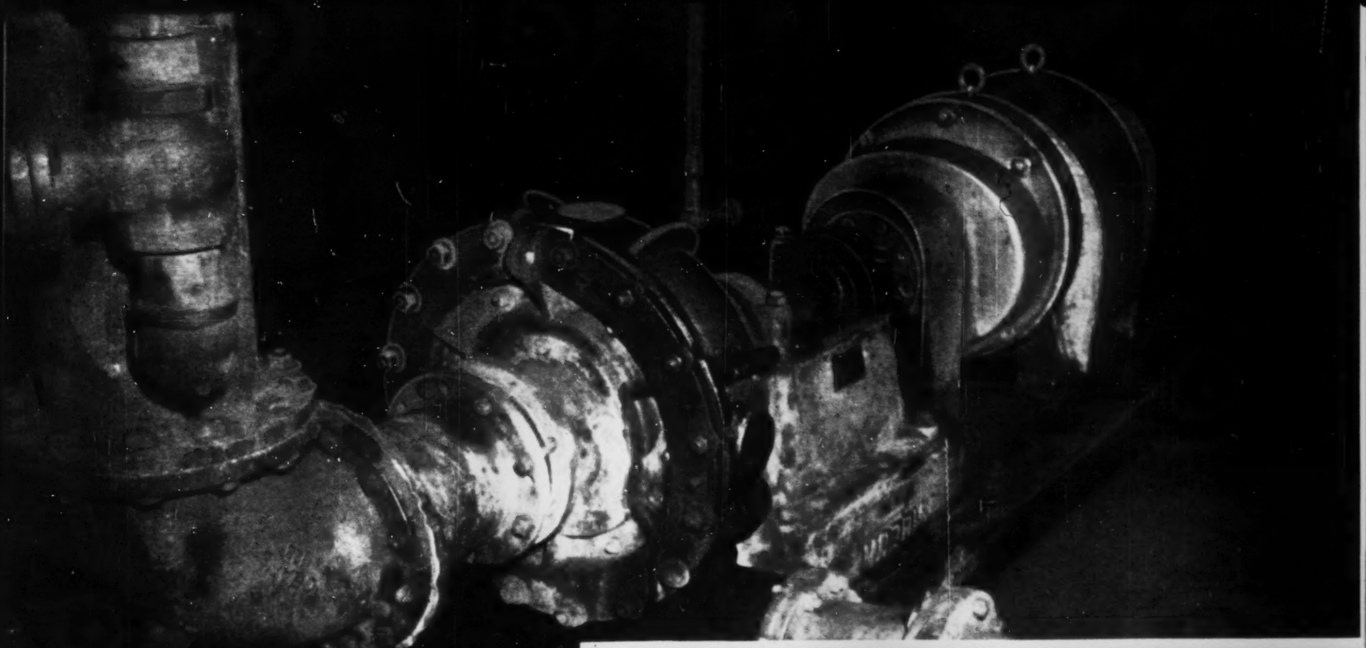

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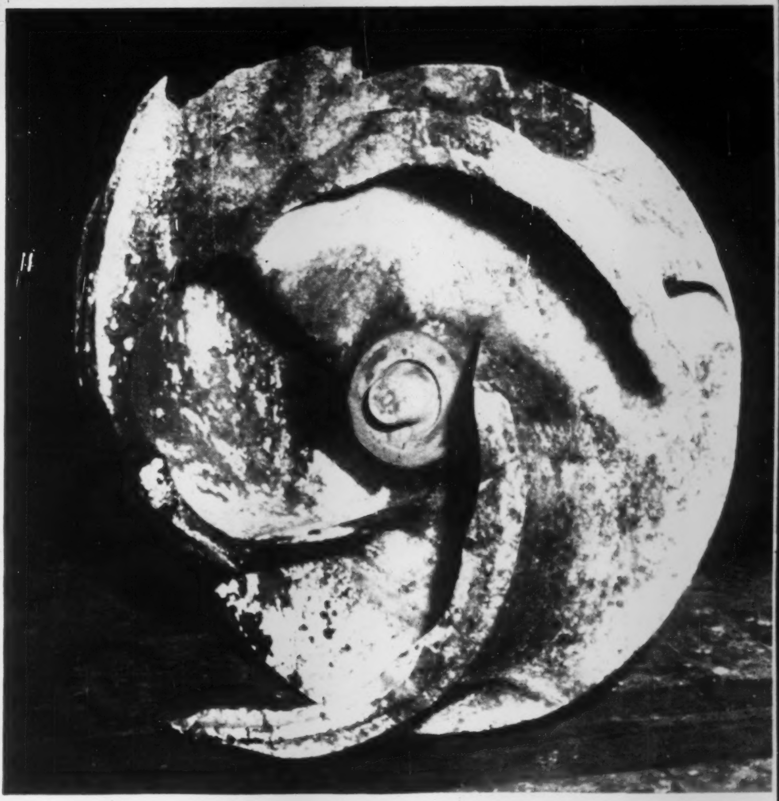

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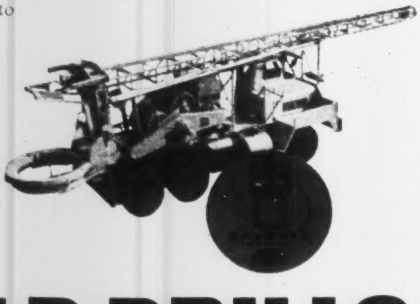

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ZONING FOR MINIMUM LOT AREA—76 pages. Communities Research Institute Project, Villanova University, Villanova, Pa. $3.50.

THE GENTLE ART OF MATHEMATICS—by Dan Pedoe. 143 pages. The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. $3.50.

THE LANGUAGE AND SYMBOLOGY OF DIGITAL COMPUTER SYSTEMS—114 pages. Government Service Department (Bldg. 210), RCA Service Company, Camden 8, N. J. $2.00.

ELECTRONICS FOR EVERYONE—by Monroe Upton. 386 pages. The Devin-Adair Co., 23 East 26th St., New York 10, N. Y. $6.95.

FILLER METALS FOR JOINING—by Orville T. Barnett. 244 pages. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. $7.00.

SIMPLIFIED PROBLEMS IN STRENGTH OF MATERIALS AND STRUCTURAL DESIGN—by Ephraim Viertels. 636 pages. Arco Publishing Co., 480 Lexington Ave., New York 17, N. Y. $5.00.

THE STORAGE OF WATER IN SAND—by O. Wipplinger. 107 pages. Clerk of the Legislative Assembly, P. O. Box 292, Windhoek, South West Africa. 2s.

APPLIED MATHEMATICS FOR ENGINEERS AND SCIENTISTS—by C. G. Lambe. 518 pages. The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. $8.50.

QUALITY CONTROL AND INDUSTRIAL STATISTICS—by Acheson J. Duncan. 946 pages. Richard D. Irwin, Inc., Homewood, Ill. $10.80.

COMPILATION OF ASTM STANDARDS ON BITUMINOUS MATERIALS FOR HIGHWAY CONSTRUCTION, WATERPROOFING, AND ROOFING—488 pages. American Society for Testing Materials, 1916 Race St., Phila. 3, Pa. $4.75 (paper cover).

EFFECT OF WATER ON BITUMINOUS PAVING MIXTURES—102 pages. American Society for Testing Materials, 1916 Race St., Phila. 3, Pa. $2.75.

FRINGE BENEFITS—by Francis M. Wistert. 155 pages. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. $3.75.

A TEXTBOOK OF FLUID MECHANICS—by J. R. D. Francis. 332 pages. St. Martin's Press, Inc., 103 Park Ave., New York 17, N. Y. $6.50.

DESCRIPTIVE GEOMETRY—349 pages. The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. $5.00.

THE WORK OF THE PUBLIC HEALTH ENGINEER—823 pages. Macdonald & Evans Ltd., 8 John St., London W.C. 1, England. 75 d net.

UPLIFT IN GRAVITY DAMS—by Serge Leliavsky. 267 pages. Frederick Ungar Publishing Co., 131 E. 23rd St., New York 10, N. Y. $9.50.

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has full information on Sumo high-capacity pumps. Call or write for your copy. Also request data on Sumo extra high capacity 120 hp units.

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Chemical Composition of Texas Surface Waters, 1956—by the U. S. Geological Survey in cooperation with the Texas Board of Water Engineers. Texas Board of Water Engineers, 1410 Lavaca St., Austin 14, Texas.

Handbook of Air Conditioning, Heating and Ventilating—1112 pages. The Industrial Press, 93 Worth St., New York, N. Y. $17.00.

The Design of Prismatic Structures—by A. J. Ashdown. 85 pages. Concrete Publications Limited, 14 Dartmouth St., Westminster, S.W. 1, Eng. $2.10.

Standards for Physical Security of Industrial and Government Facilities—by Executive Office of the President, Office of Defense Mobilization. Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 30 cents.

Specification for Low Alloy Steel Covered Arc-Welding Electrodes—by American Welding Society and the American Society for Testing Materials. American Welding Society, 33 West 39th St., New York 18, N. Y. 50 cents.

How To Be More Comfortable and Live for Less—an insulation booklet by the National Mineral Wool Association, 2906 Americas Building, Rockefeller Center, New York 20, N. Y. Single copies free.

Construction Takes a Forward Look—proceedings of the 6th Annual Construction Conference of the Cleveland Engineering Society. Cleveland Engineering Society, 2136 East 19th St., Cleveland 15, Ohio. $1.

Topographic Mapping In The United States and Topographic Mapping In Areas Outside of Continental United States (1959 Status Indexes)—United States Department of the Interior, Geological Survey, Washington 25, D. C.

Index of Surface Water Records of Texas, 1882-1957, Discharge, Sediment, Chemical Quality, and Water Temperatures. Texas Board of Water Engineers, 1410 Lavaca St., Austin 14, Texas. Free.

First Supplement To Bibliography On Maine Geology 1836-1957—40 pages. State Geologist, Department of Economic Development, Room 211, State Office Building, Augusta, Maine. 10 cents.

Stages And Discharges Of The Mississippi River And Its Outlets And Tributaries, 1957—300 pages. Mississippi River Commission, Corps of Engineers, U. S. Army, P. O. Box 80, Vicksburg, Miss. $1.00.

Correlation Of Reservoir Sedimentation And Watershed Factors, Springfield Plain, Illinois—By J. B. Stall and L. J. Bartelli. Illinois State Water Survey, Box 232, Urbana, Ill. Free.

Geology and Ground Water Resources of Kinny County, Texas—By R. R. Bennett and A. N. Sayre of the U. S. Geological Survey. Texas Board of Water Engineers, 1410 Lavaca St., Austin 14, Texas.

Two Gurley transits feature built-in optical plummets

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The Gurley Optical Plummet Transit (Model OP-57) has proved itself to be such an important time and money saver in the field that this optical plummet feature has also been added to the Model 132 Standard Precise Transit. The new transit will be known as the OP-137.

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Armco HEL-COR Pile Shell is a continuous lock-seam corrugated metal pipe made on automatic machines.

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For complete data on Armco Pile Shells, send coupon. Armco Drainage & Metal Products, Inc., 4539 Curtis Street, Middletown, Ohio. In Canada: write Guelph, Ontario.

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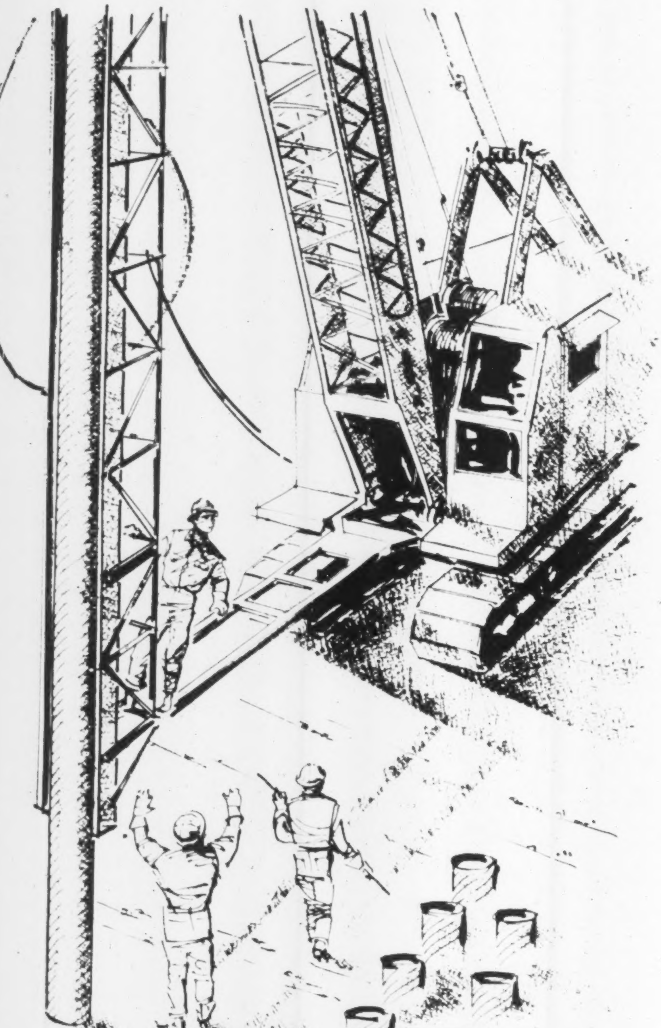

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Here's a new service: You can order the publications you want all at once. See the inquiry card on p. 183.

Construction Equipment

1. Portable plant

Complete specifications, dimensions, weights and power requirements of a single-crusher plant are included in 4-page Form 676. Pioneer Engineering Div. of Poor & Co., Inc.

2. Batching plant

A line of portable, unitized batching plants is illustrated and described. 4-page bulletin CB-100. Clark Industries, Construction Equipment Div.

3. Cranes

Specifications, working ranges and lifting capacities of a 25-ton crawler crane and a 30-ton rubber mounted crane. Graphic illustrations of scope of cranes as back hoes, shovels, draglines and clamshells are included. 8-page Catalog 200-3. Insley Manufacturing Corp.

4. Cranes

A 10-page booklet gives photographs and descriptions of a ¾-cu-yd excavator, a 15-ton crawler crane and a 20-ton rubber mounted crane. Catalog 300-3. Insley Manufacturing Corp.

5. Excavator-crane

A 20-page, two-color sales catalog with photos and descriptive information on a 1½-cu-yd excavator, a 30-ton crawler crane and a 35-ton rubber mounted crane. Catalog 192-A. Insley Manufacturing Corp.

6. Excavator-crane

The truck, the upper mechanism and front-end attachments of a 25-ton truck crane are described and illustrated in the 24-page Bulletin 2400A. Clark Equipment Co.

7. Truck-crane

An 11-ton carrier-mounted crane-excavator, a line of crane-carriers and a line of front-end attachments are illustrated and described in a 12-page Bulletin T-350. Schield Bantam Co.

8. Truck cranes

Extensive information on truck mobility, axle loads, crane working range and lifting capacities of two models of a 35-ton truck crane are given in an 8-page Catalog 192-8A. Insley Manufacturing Corp.

9. Shovel-crane

The ¾ yard LS-78 shovel-crane is pictured in detail and on-the-job in a 24-page catalog 2725-4-59. Link-Belt Speeder Corp.

10. Excavators

Mounting details, engineering data and attachments for the Model G-1000 Gradall are provided in folder G5914. Warner & Swasey Co.

11. Excavators

Lifting capacities, working range and general specifications of five hydraulic excavators ranging from ⅛ to ½ yard are given in a 16-page brochure 5719. Badger Div., Warner & Swasey Co.

12. Motor grader

Specification sheet gives detailed engineering data on the "Forty Five" motor grader MS-1325. Allis-Chalmers Mfg. Co.

13. Unloaders

Details of operation, construction and capabilities of three unloaders with hopper capacities of 50 tons, 75 tons and 100 tons. 16-page booklet. Clyde Iron Works, Inc.

14. Screw conveyor drive

Detailed description and specifications for screw conveyor drive. Includes photographs, engineering drawings, and dimensions prices and tables for selection of units and v-belt drives for various loads and speeds. 16-page bulletin A667C Dodge Mfg. Corp.

15. Belt conveyor

Breakaway illustration shows makeup of sectional belt conveyor. 4-page bulletin 458. Stephens-Adamson Mfg. Co.

16. Lift trucks

A review of the engineering features of a line of lift trucks with capacities ranging from 2,000 lb to 10,000 lb is carried in BU-452. Allis-Chalmers Mfg. Co.

17. Fork trucks

Detailed engineering data, specifications and operating information on more than 25 basic fork truck models and their major attachments. The Elwell-Parker Electric Co.

For More Information . . .

. . . Select the publications you want and circle the key numbers on the inquiry card at the end of this section.

18. Power buggy

Description of a 10-cu-ft power buggy and its "dead man" brake arrangement. Leaflet No. BG-1. Aeroil Products Co.

19. Pipe lifters

Steel lifters for handling concrete pipe up to 72 in. in diameter and 8 ft long. Catalog CP 459. Cady Metal Fabricating Inc.

20. Refuse collector

Four page catalog on Load-Packer 600 refuse-collection unit includes a specification sheet. Gar Wood Industries, Inc.

21. Tractor

A pictorial description of the versatility of the Caterpillar D7, D6 and D4 tractors. 8-page booklet D904. Caterpillar Tractor Co.

22. Tractor

Engineering specifications for the HD-16, HD-16-DC and D diesel powered tractors are given on data sheets MS-1192 and MS-1284. Allis-Chalmers Mfg. Co.

23. Tractor dozers

Photographs, text and graphs outline the performance and properties of a line of three turbo-charged diesel-powered tractor dozers in Bulletin TD-1500. Clark Equipment Co.

24. Tractor scrapers

Three tractor scrapers with capacities of 8 cu yd, 12.7 cu yd, and 20 cu yd are described in a three-color illustrated booklet. Construction of component parts is detailed. 20-page Bulletin TS1000. Clark Equipment Co.

25. Tractors

The 105 series of tractors and tractor units, their specifications and combinations. 16-page booklet L-1074. The Eimco Corp.

26. Wheeled tractors

Drawings, specifications and performance characteristics of the Model T-2258 and the Model T-300S 4x4 Paymover tractors. 10-page booklet. Frank G. Hough Co.

27. Tractors and equipment

Specifications, sizes and illustrations of a line of tractors and equipment. Includes loaders, backhoes, bulldozers, scrapers and trenchers. 24-page folder. John Deere Industrial Div.

28. Tractor shovel

Specification sheet explains features of the Model 304 tractor shovel with capacity of 2 to 4 cu. yd. 2-page bulletin. Trojan Div., Yale & Towne Mfg. Co.

(Publications continued p. 166)

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CIRCLE S-4 READER SERVICE CARD

29. Trucks

A catalog describes and illustrates trucks for industrial use, fork truck attachments, major truck component and a special design service. 12-page pamphlet. Elwell-Parker Electric Co.

30. Trucks

Specifications, descriptions and illustrations of a wide range of trucks for various uses. Ford Division, Ford Motor Co.

31. Dump trucks

Specifications, job photos and details of construction of the Model R10 rear dump are outlined in the 8-page Form 151R4. Euclid Div. of General Motors Corp.

32. Scraper

Construction details, specifications and servicing data for the S18 hydraulic scraper. 16-page, three-color folder Form 511. Euclid Div. of General Motors Corp.

33. Skid shovel

A 16-page, two-color catalog uses on-the-job photos to show uses of the International Drott TD15 four-in-one skid shovel. CR6-100-1. International Harvester Co.

34. Loaders

The matching of loaders and backhoes with International 240, 340, 460 and 560 utility tractors. 16-page, two-color catalog. CR-1076-I. International Harvester Co.

35. Heavy-duty vehicles

Examples of unusual vehicles produced for special demands of road maintenance, ready mix concrete, highway transport, mining and fire fighting. 8-page booklet. FWD Corp.

36. Pneumatic tire roller

Description of capacities and components of a self-propelled, nine-wheel pneumatic tire roller. Complete specifications are included. 4-page bulletin. Rosco Mfg. Co.

37. One-ton roller

Features and specifications of the Model 125 one-ton roller. 2-page sheet KK-39. Littleford Bros., Inc.

38. Trench digger

The capabilities of two trenching tools are detailed in this color-illustrated folder. 4 pages. Charles Machine Works.

39. Drilling machines

Mobile diamond drilling equipment described and illustrated. Heavy duty drill for holes up to 20 in. in diameter included. 2-page bulletin. Masonry Drilling Div., Wheel Trueing Tool Co.

40. Air drill

Drill specifications, mechanical data and illustrations of the M-8TA tractor-mounted rotary air drill. Form E-7335. Davey Compressor Co.

41. Diesel engines

Design, construction and mechanical advantages of two diesel engines, the 230-ph 16000 and the 340-ph 21000. Illustrations, charts, graphs and a cutaway view of the engines. 16-page catalog BU-540. Allis-Chalmers Mfg. Co.

For More Information . . .

. . . Select the publications you want and circle the key numbers on the inquiry card at the end of this section.

42. Diesel engines

The operation of diesel engines are described and the work-producing ability, economy of operation and life span of gasoline and diesel engines are compared. 8-page brochure. Detroit Diesel Engine Div., General Motors Corp.

43. Diesel engine

The 385-hp UDT-817 diesel engine is described with photographs, fuel consumption graphs and performance curves. 4-page folder CR684-I. International Harvester Co.

44. Heavy-duty engines

Detailed description, with illustrations, of construction and capabilities of Ford's 302 and 332 HD V-8 truck engines. Ford Div., Ford Motor Co.

45. Air-cooled diesel engines

Detailed descriptions of a line of two-cycle, air-cooled diesel engines and dimensional drawings and performance curve charts. Hercules Motor Corp.

46. Electric motors

Description of a line of AC and DC standard motors, special motors, gearmotors and adjustable speed drives. Characteristics and modifications for 20 basic types of motors and drives ranging from ¾ hp to 2,000 hp. 8-page Bulletin 2650. Louis Allis Co.

47. Electric motor

A 2-page leaflet describes and gives performance data on a new 1.6 h-p, 28-volt d-c motor. Hoover Electric Co.

48. Compressors

A line of air compressors designed for painting, tire inflation and fumigation is described. Specifications, model data and performance data are included. 4-page Bulletin PP 300. Campbell-Hausfield Co.

49. Generators

A 4-page folder on electric generators for fishing fleets, work boats, draglines, shovels and magnet cranes is offered. The folder describes three types of generators: alternating-current, battery-charging and tractor-drive models. Specifications of the various controls such as switchboards, rheostats and manual transfers, are given and illustrated for each type. Folder F-141. D. W. Onan & Sons Inc.

50. Air hoists

Specifications, operating data and accessory information on a line of air hoists built in capacities from 1,000 to 2,000 lb in hook or trolley types. 8-page booklet. Yale & Towne Mfg. Co.

(*Publications continued p. 170*)

Some Ideas

for your file of practical information on drafting and reproduction
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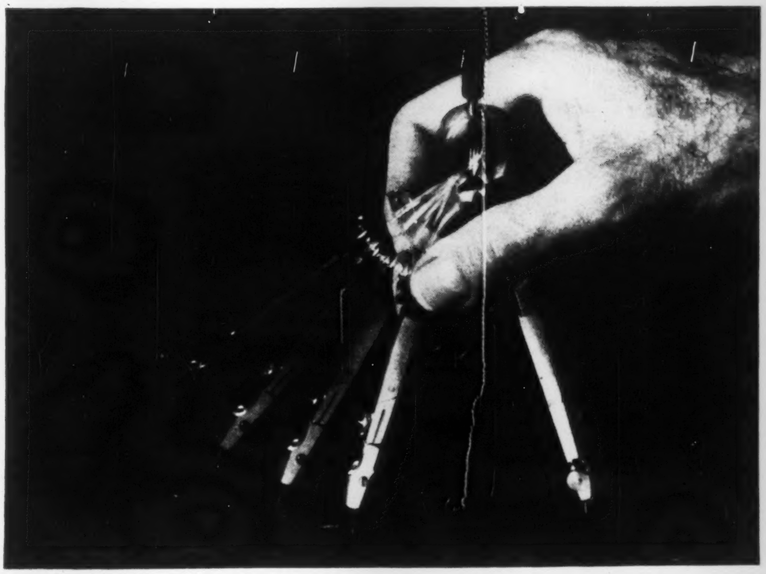
One of the ways to judge a skilled craftsman is by the tools he uses. They're invariably the best he can find – chosen to lighten his work, sharpen his skills. And, if the craftsman is a draftsman, they are, more often than not, products of K&E.

It may be that some of these products have escaped your attention (after all, we offer something over 8000 items). That's why we suggest you pay a visit to your K&E dealer whenever you can. It's a liberal education on what's new – as well as what's tried and true – in drafting equipment.

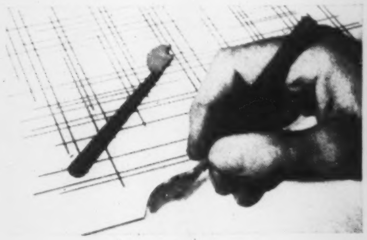
You'll find many products like these which can be highly useful in your work . . .

K&E "Quick Set" Bow Compass

The most remarkable feature of this compass is the speed and ease with which you can change settings–from diameters of 12 inches to 1/16 inch. With one hand, you can increase or decrease radii instantly and exactly. To go from small to larger radius, just press a spring release, and the legs will expand automatically. Stop approximately where you want, and make precise adjustments with a micrometer screw. To go from large to small, simply squeeze the legs of the compass together, then adjust precisely.



The K&E Quick Set combines the rigidity and precise adjustment of a standard bow compass, the simplicity and speed of a friction type compass, plus the finger tip control of K&E's unique design. You have to try the Quick Set to appreciate it fully. Two types are available. The N1071 fixed leg pencil compass, and the N1070 combination with interchangeable pen and pencil inserts. Both come with a box containing leads and spare needles. And with the N1070, a pen handle is provided for the pen insert which permits its use as a ruling pen. The compass can also be used as a divider by substituting one of the spare needle points for the lead in the pencil insert.



Marathon® Ruling Pens

K&E Marathon Long Line and Wide Line Ruling Pens (1092) hold an extra large ink supply – draw lines up to eight times longer than ordinary ruling pens. And because they are pre-set, line widths are always uniform, easy to match with complete accuracy. Ink flow is regular and even, lines are always sharp and clean edged.

An important feature of K&E Marathon Ruling Pens is that they will *not leak*. They can be laid on the work surface without risk of ink flowing out. That means you can fill several pens of different widths, use them as freely as you'd use pencils. They're easy to clean, too.

K&E Marathon Long Line Ruling Pens are available individually in line widths of .006, .009, .013, .020 inch – or in sets of three pens in line widths of .009, .013, .020 inch in a Leatherite case. Marathon *Wide Line* Ruling Pens come in line widths of .030 and .060 inch.

Leroy® Height and Slant Control Scriber

A versatile new Leroy scriber is now available which greatly expands the variety of lettering possible from a standard Leroy template.

Now, with the new Height and Slant Control Scriber (3237-12), you can form characters from vertical to slanting at any angle up to 45° forward. You can vary height from 60% to 150% of the size of letters on the template used. The width of letters remains the same.

Combinations of height and slant can be set quickly and easily. You just loosen the knob, move the scriber arm to the desired combination of height and slant, and tighten. That's all there is to it.

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CIRCLE S-5 READER SERVICE CARD

CIRCLE S-6 READER SERVICE CARD →

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Building of the $137 million Keystone Dam, west of Tulsa, Oklahoma, on the Arkansas River, necessitates relocation of two main line railroads. One of these projects is 14.5 miles in length and involves 5,418,000 cu. yds. of earthmoving. Cosmo Construction Company has a 1.7 million-yard contract with the Army Corps of Engineers, Tulsa District, for two of the four railroad embankment sections on this big relocation project.

Cosmo is using 4 Euclid S-18 scrapers with 4-speed Torqmatic Drives and converter lock-ups. Material being loaded is of two types—hard shale and clay hardpan. A Model TC-12 Euclid Twin-Power Crawler and another tractor of over 200 h.p. push-load the scrapers. On round trip hauls of approximately 3500 ft., each S-18 averages 100 loads per 10 hour shift for a production of 220 bank yds. per hour.

Project Manager Stell Dobbs uses the big Euclid TC-12 for push loading the scrapers in the heavy shale—a very difficult material for scraper loading. In this way he makes effective use of the 425 net h.p. in the pusher and 336 h.p. in the scraper—Torqmatic Drive in both machines helps to make this combination a high production team on a tough job.

See your Euclid dealer for information on the complete line of Euclid earthmovers . . . he can show you how big power, big capacity, big performance "Eucs" can bring you a better return on investment.

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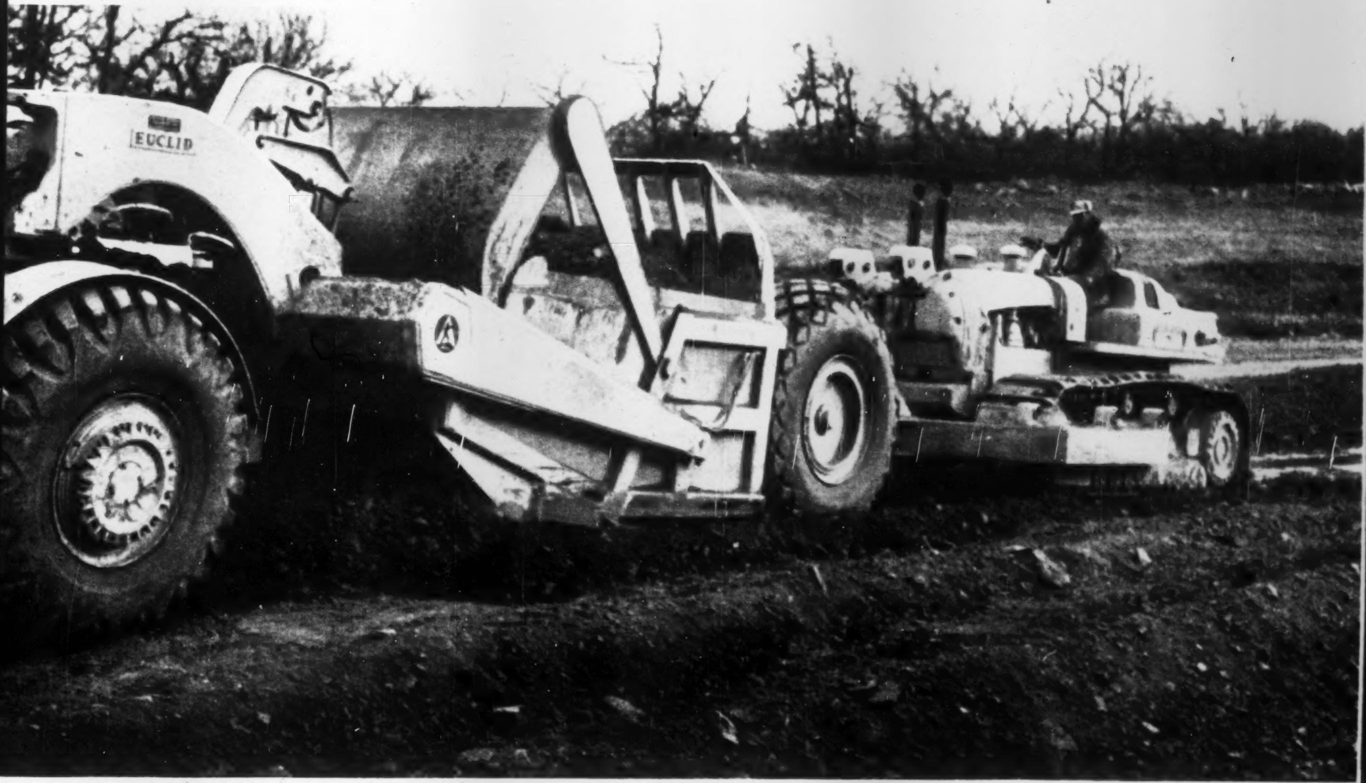
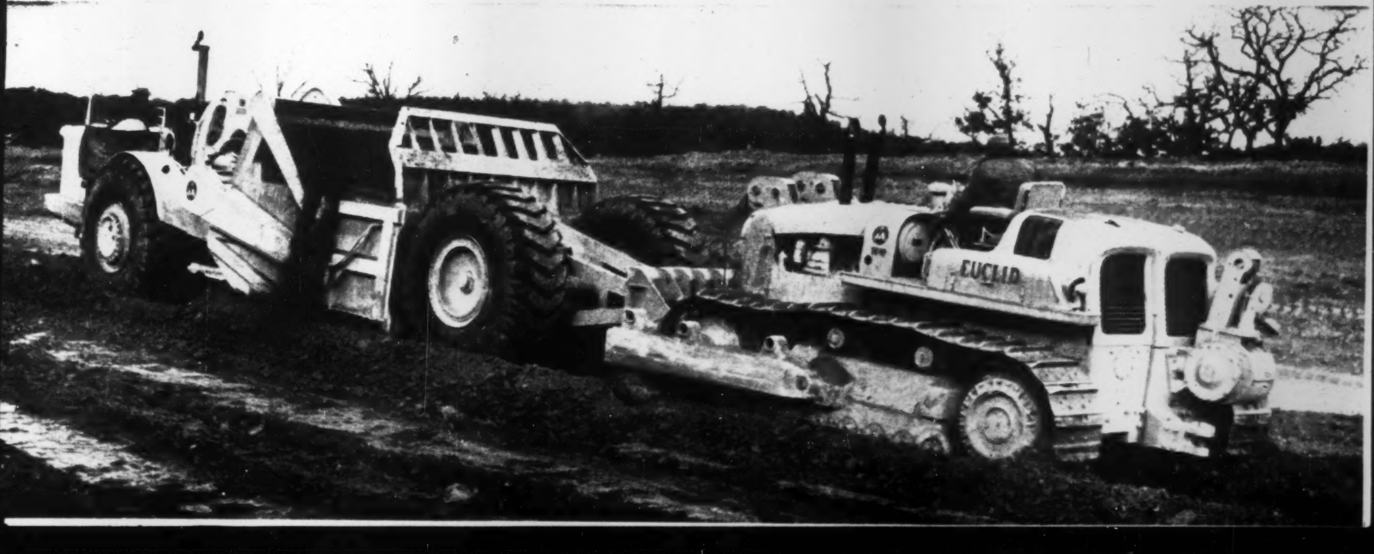
Scrapers Maintain High Production on Railroad Relocation Project



Here's big power at work . . . TC-12 "Twin" Crawler (425 net h.p.) and S-18 Scraper (336 h.p.) team up to get a 22 bank yd. load of heavy shale in a hurry.



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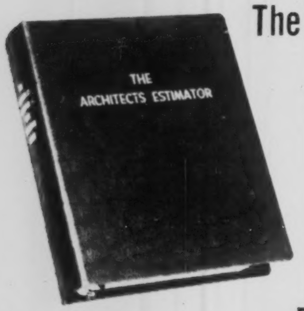

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CIRCLE S-8 READER SERVICE CARD

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. . . Select the publications you want and circle the key numbers on the inquiry card at the end of this section.

51. Air hoist

Illustrations and specifications of a line of air hoists that changes in capacity from 1,000 lb to 25,000 lb. 4-page Bulletin 861. Detroit Hoist & Machine Co.

52. Air starting motors

Case histories, how to select and advantages of air starting motors for internal combustion engines. 24-page booklet. Ingersoll-Rand Co.

53. Transmission

Specifications and installation dimensions of a 12-speed transmission for heavy-duty vehicles. Dana Corp.

54. Buckets

An "orange peel" bucket comes in ½ and 2 cu yd sizes. Larger buckets built on request. The smaller bucket weighs 2,000 lb; larger 12,000 lb. Yaun Mfg. Co., Inc.

55. Dozer and scraper blades

This pamphlet describes the manufacture of blades for scrapers and dozers. 8-page Booklet CR-177-1. International Harvester Co.

56. Scraper edges

A pictorial description of the manufacturing processes employed to produce scraper and bulldozer edges, router bits and end bits. 8-page brochure DE 853. Caterpillar Tractor Co.

57. Sprockets and idlers

Design characteristics and manufacturing processes of a line of idlers and sprockets are detailed. 8-page Booklet D868. Caterpillar Tractor Co.

58. Dipper tooth

Over 400 tooth-point and tooth-adapter models for every make of shovel, dipper and backhoe. Description of the Simplex 2-part tooth. 16-page catalog. American Manganese Steel Div., American Brake Shoe Co.

59. Dust-tight enclosures

A leaflet describes and illustrates dust-tight enclosures for floor-mounted single, double and triple-deck "Ripl-Flo" vibrating screens. Allis-Chalmers Mfg. Co.

60. Field lubricators

A 28-page catalog is devoted to a line of portable field lubricators designed to be carried by truck. A line of supplementary equipment is also described. Catalog 701. Gray Co.

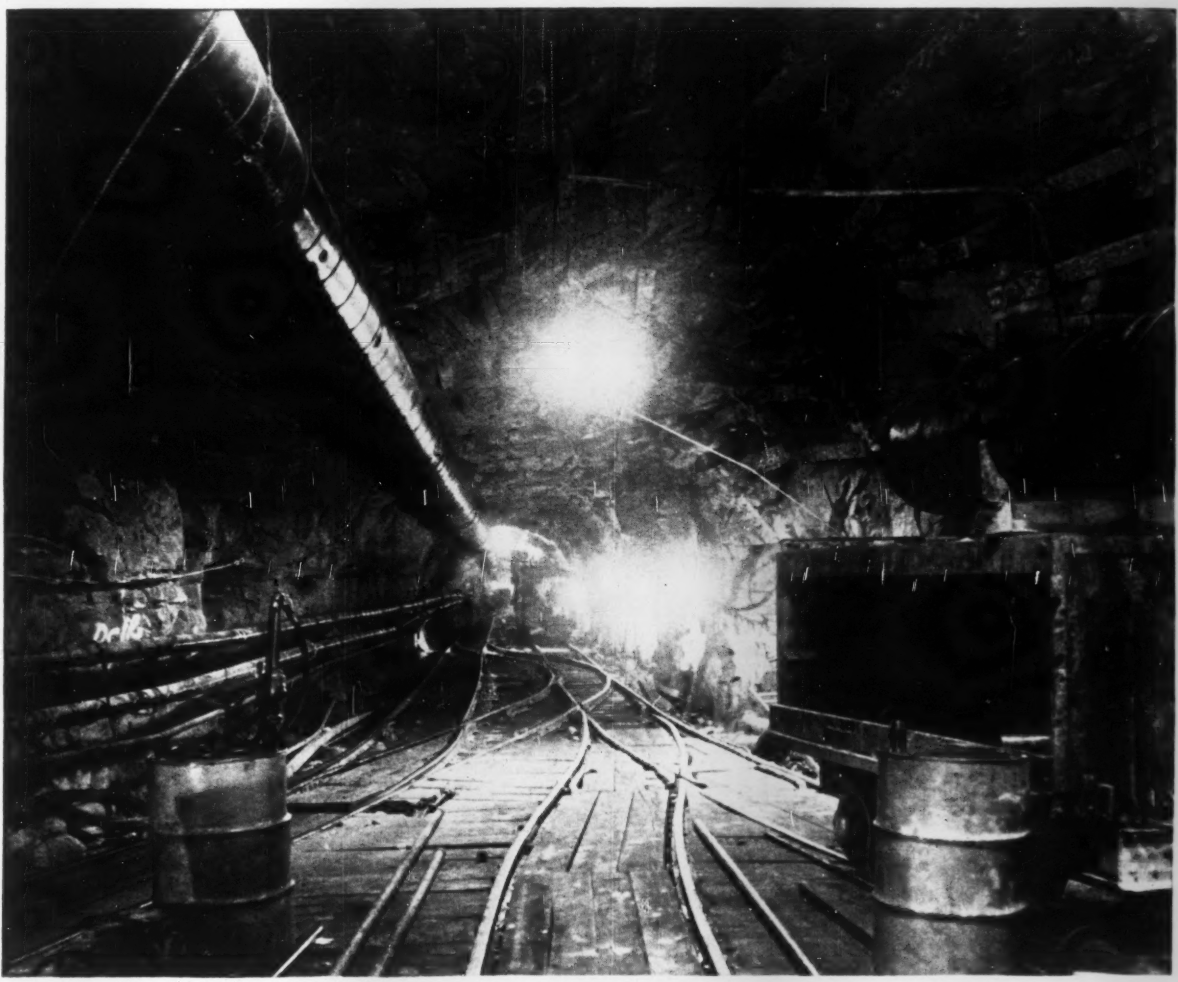
61. Scale feeders

An 8-page bulletin describes and illustrates equipment for the continuous weighing of free-flowing solid materials. Wallace & Tiernan, Inc.

62. Flotation tires

An illustrated catalog gives specifications and prices of flotation tires for all types

The Right Climate For Underground Operations



Keeping underground working areas free of gases and fumes and supplying fresh air for tunnel work is no problem when you use NAYLOR Spiralweld pipe lines.

This dependable pipe is light in weight, easy to handle and install, strong and safe in service—particularly on push-pull ventilating operations. And when you make connections with the NAYLOR one-piece Wedgelock Coupling, you can set up lines quickly with just one side of the pipe in the open. **For the details, write for new Bulletin No. 59.**

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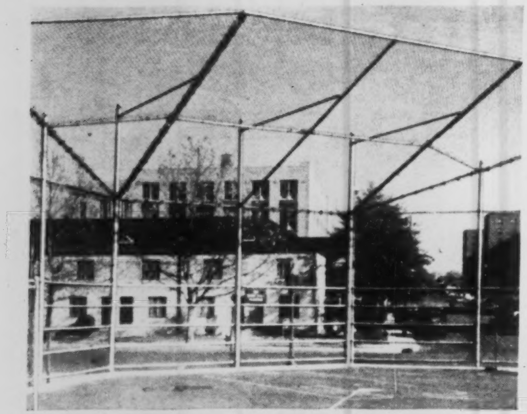

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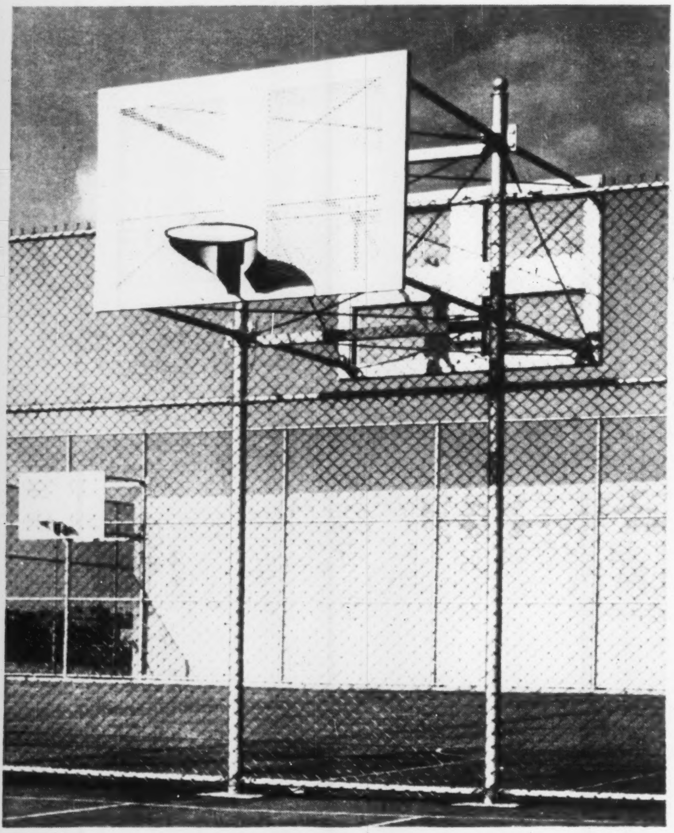

Chain Link Fencing of Alcoa Aluminum Defies Deterioration

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Alcoa Aluminum alloys are highly corrosion resistant and provide extra strength to defy abuse and absorb impact. Lightweight aluminum is easily relocated; reclaimed sections blend in with the new. Chain link fencing of Alcoa Aluminum erected over 30 years ago still stands today, unimpaired in strength or appearance.

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ALCOA ALUMINUM

Your Guide to the Best in Aluminum Value

For Exciting Drama Watch "Alcoa Theatre," Alternate Mondays, NBC-TV, and "Alcoa Presents," Every Tuesday, ABC-TV of off-the-road vehicles. Matching tubes, wheels, rims and stub axles are also shown. 64-pages. Harmo Tire & Rubber Corp.

63. Torque converters

Design and principle of operation of a line of torque converters and their use on excavating equipment are described and illustrated. 12-page booklet. National Supply Co.

64. Drives

Condensed specifications for twin-disc friction and fluid drives. 20-page bulletin 314-40M-9-58. Twin Disc Clutch Co.

65. Nut runner

Specifications and prices for ½ in. drive, heavy duty electrical impactool are given in Form PL-5252. Ingersoll-Rand Co.

66. Explosive bags

An 8-page booklet explains methods of filling and closing explosive bags, loading techniques and gives performance and cost data. Bemis Bros. Bag Co.

67. Steel stakes

A line of solid steel construction stakes and accessories. Includes coupon for handbook showing stakes uses. 4-page bulletin. Dee Concrete Accessories Co.

68. Power driven fasteners

Specifications, properties, proper loads, applications and design limits on fasteners with drawings, tables, glossary. 48-page loose leaf handbook. Olin Mathieson Chemical Corp.

69. Asphalt road tools

A line of blacktop maintenance and construction equipment from distributor trucks through push-brooms. Includes check off list for more information. 24-page catalog. Littleford Bros.

70. Concrete forms

16-page booklet covers residential and light commercial forming. A supplementary 4-page bulletin provides data on forms for heavier commercial construction. Simplex Forms Systems, Inc.

Building Equipment

71. Curtain walls

This is the first of a continuing series of data sheets on steel curtain wall construction, designed to assist architects and engineers. It contains complete detail drawings of the architectural metalwork of the First Federal Savings & Loan Association Building in Philadelphia. U. S. Steel Corp.

72. Curtain walls

A line of custom-designed metal curtain walls for various types of building construction. 12 pages. Albro Curtin Wall Catalog 3A. Albro Metal Products Corp.

73. Sandwich panels

A 116-page study defines the status of plastic structural sandwich panels and explores their architectural potentialities. "Building with Plastic Structural Sandwich Panels" may be purchased for $3.00 from Department SP, Monsanto Chemical Co.

For More Information . . .

. . . Select the publications you want and circle the key numbers on the inquiry card at the end of this section.

74. Porcelain panels

New catalog offers technical data and installation details of porcelain enamel panels for building exteriors and interiors. 8 pages. Seaporcel Metals, Inc.

75. Porcelain enamel

Six new 4-page data sheets on porcelain enamel and porcelain enamel-stainless steel curtain walls for office and commercial building and school. Armco Steel Corp.

76. Architectural aluminum

Describes the advantages of aluminum in architectural applications and includes technical information and properties of architectural alloys. 24-page booklet. Kaiser Aluminum & Chemical Sales, Inc.

77. Aluminum in schools

A 64-page booklet describing uses of aluminum and aluminum products in school construction, classrooms and allied equipment. Kaiser Aluminum & Chemical Sales, Inc.

78. Architectural metals

"Architectural Metals by Anaconda" is a detailed reference book covering the uses of copper and copper alloys in current architectural design. 64 pages. The American Brass Co.

79. Plywood construction

General information booklet "Fir Plywood for Today's Construction." contains data on physical properties of fir plywood and requirements for plywood construction. 12 pages. Douglas Fir Plywood Association.

80. Structural clay

The 1959 catalog of Natco Corp's structural clay products includes descriptive, specification and construction data. 24-page brochure No. S-59. Natco Corp.

81. Ceiling systems

New ceiling systems are described with mounting details, lighting characteristics, shielding media, dimensions and ordering information. Three 6-page folders. Smithcraft Lighting.

82. Western red cedar

Illustrates standard and utility grade of both lumber and panels. Discusses insulating qualities, dimensional stability and gluing properties, durability and weathering. 36 pages. West Coast Lumbermen's Association.

83. Foamglass insulation

A 20-page catalog with information on uses of cellular glass insulation on roofs, parking decks, core walls, linings, ceilings. Includes drawings and specifications, charts for computing required U-value. Booklet FB-105. Pittsburgh Corning Corp.

84. Joint sealer

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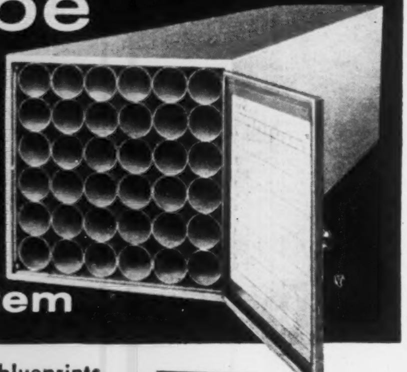

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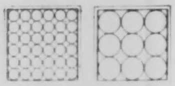

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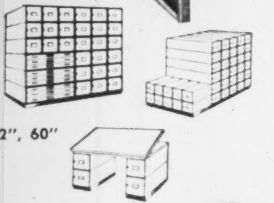

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For More Information . . .

. . . Select the publications you want and circle the key numbers on the inquiry card at the end of this section.

for sealing joints in portland cement concrete paving used by jets is described. Presstite Div. American-Marietta Co.

85. Epoxy adhesive

Fact book on liquid polymer-epoxy adhesive. Properties, uses and application examples of the tough bonding agent. 20-page booklet. Thiokol Chemical Corp.

86. Piling

Pipe piles, caissons and pile shells are described in an 18-page pamphlet which also includes data on pile driving hammers and the computation of pile bearing capacity Catalog FP-13558. Armco Drainage & Metal Products, Inc.

87. Stainless steel

Detailed information on commercial stainless steel sheet and strip. Includes comparitive corrosion-resistance tables of stainless steel Types 302, 316, 430 and aluminum Type 1100, as well as physical properties and analyses, surface finishes. Washington Steel Corp.

88. Steel, aluminum, data

New edition of Ryerson Data Book includes aluminum analyses, characteristics, mechanical properties and tolerances. It also contains previously published information on steel such as machining and fabricating data, manufacturing practices and tolerances, weights, safe loads, and ASTM standards. 256 pages. Joseph T. Ryerson & Son Inc.

89. Copper alloy

Phosnic Bronze, a high copper alloy with high strength, and high electrical and thermal conductivity is described in an eight-page booklet. Chase Brass & Copper Co.

90. Soldering aluminum

Data on soldering fluxes, irons and flames, and data on actual soldering methods of aluminum. "Soldering Aluminum." 22 pages. Reynolds Metals Co.

91. Honeywell index

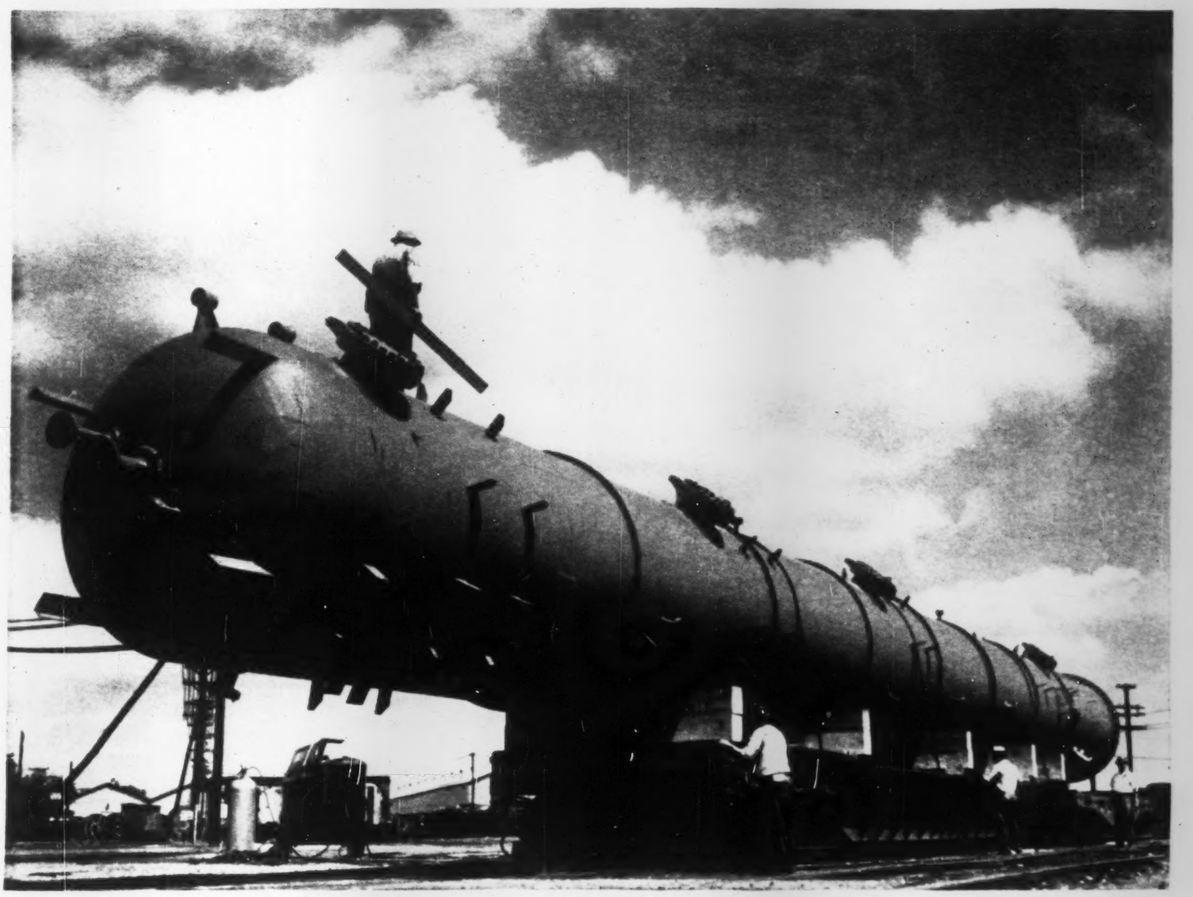
Index of Literature lists Honeywell's Industrial and Valve Div., literature, such as product catalogs, specifications, technical bulletins, instrumentation data sheets and systems bulletins. 24-page bulletin No. G2-1a. Minneapolis-Honeywell Regulator Co.

92. Stainless steel

A 159-page reference manual entitled "Buyers' Guide for Stainless Steel Products and Services." It lists 3,000 firms that make products of stainless steel or offer related services. The Committee of Stainless Steel Producers, American Iron and Steel Institute.

93. Industrial lighting

Fixture cost comparisons, cost of lighting per square foot and many examples of in-



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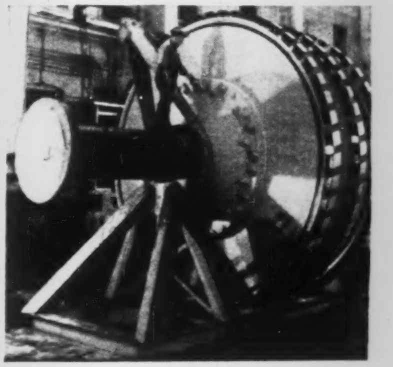

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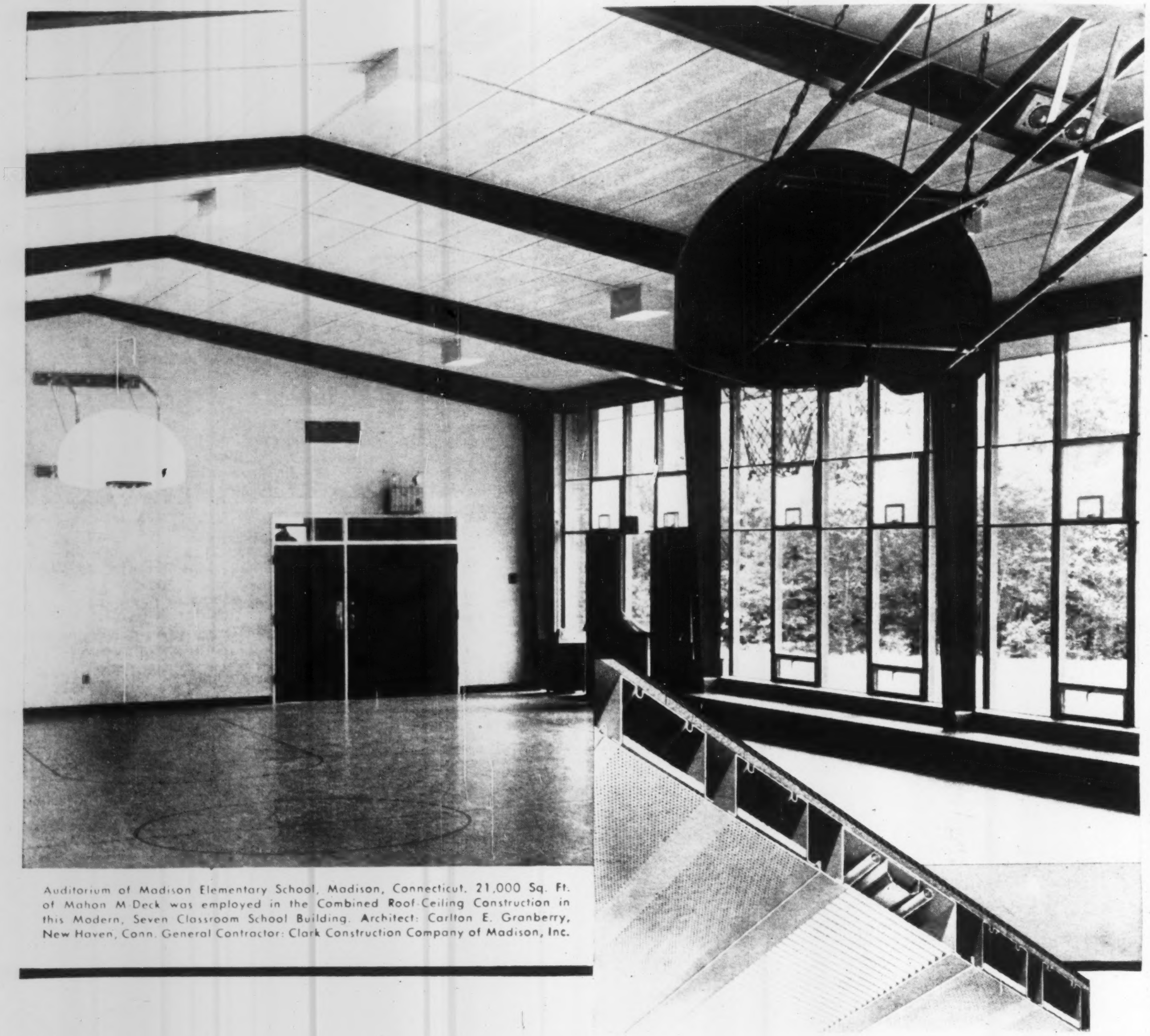

Auditorium of Madison Elementary School, Madison, Connecticut. 21,000 Sq. Ft. of Mahon M-Deck was employed in the Combined Roof-Ceiling Construction in this Modern, Seven Classroom School Building. Architect: Carlton E. Granberry, New Haven, Conn. General Contractor: Clark Construction Company of Madison, Inc.

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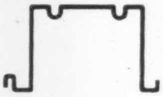
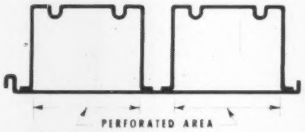
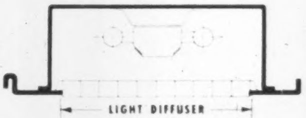


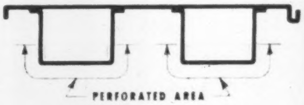
SECTION M1-OB
OPEN BEAM DEPTH 3", 4½", 6" or 7½"



SECTION M2SR (Acoustical)
CEL-BEAM DEPTH 1½", 3", 4½", 6 or 7½"



SECTION M1T (Troffer)
DEPTH 6" or 7½"



SECTION M2 (Acoustical)
CEL-BEAM DEPTH 1½", 3", 4½", 6 or 7½"

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☆ *For INFORMATION See SWEET'S FILES or Write for Catalogues*

At Left: Cross Section of Long Span M-Deck Combined Roof-Ceiling with Troffer Lighting.

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CIRCLE T-7 READER SERVICE CARD

stallations are offered in a 16-page booklet on industrial lighting. Day-Brite Lighting, Inc.

94. Emergency lighting

The 1959 catalog of emergency lighting equipment. 8 pages. Electric Cord Co.

95. Lighting fixture

The 1959 Moe catalog of lighting fixtures. 48 pages. Moe Light Division. Thomas Industries Inc.

96. Hospital lighting

Specifications and data on 18 hospital lighting fixtures and systems. 8-page catalog HL. Alkco Mfg. Co.

97. Underfloor ducts

Spang electrical raceway fittings for communication and power distribution systems. 6-page bulletin No. 493. National Supply Co.

98. Heating and ventilating

Product bulletin describing Herman Nelson heating and ventilating units. 20-page bulletin. American Air Filter Co., Inc.

99. Air grilles

A guide to the newly developed line of Airline Grilles includes engineering details. 6 pages. Waterloor Register Co., Inc.

100. Multizone blowers

Technical details for a line of blowers for multizone central air conditioning systems for office buildings, hospitals, laboratories and commercial buildings. 4-page catalog No. 1635-B. Westinghouse Sturtevant Div.

101. Aluminum application

"The Alcoa Report to the Building Industry" describes the cost economies of aluminum for electrical applications. Topics covered include conduit wire and cable, bus conductor, busway, enclosures and switchgears, lighing fixtures and accessories. 32 pages. Aluminum Co. of America.

102. Industrial switches

Details about the line of heavy duty limit switches for industrial use. 16-page catalog. No. 84. Micro Switch.

103. Lighting fixture

Two-page bulletin describes construction and performance of an out door substation lighting fixture with a prismatic glass lens top. Copies of photometric test reports are included. Holophane Co. Inc.

Installed Equipment

104. Sewage treatment unit plant

Data manual on the S & L "Oxigest" factory-built sewage-treatment plant contains notes on design, engineering data, specifications and installation instructions. Smith & Loveless, Inc.

105. Sewage lift stations

Manual on factory-built sewage lift stations. Contains bulletins, selection charts, diagrams, installation data, and specifications for pump-type or pneumatic ejector lift stations. 100 pages. Smith & Loveless, Inc.

For More Information . . .

. . . Select the publications you want and circle the key numbers on the inquiry card at the end of this section.

106. Water and sewage equipment

Drawings, charts and photographs plus text make up Catalog 952 on water and bar screens, grinders, collectors, settling tanks, flocculation controls, feeders, conveyors, bucket elevators, chains and sprockets for water, sewage and industrial waste treatment. Jeffrey Mfg. Co.

107. Wells

Principles of development of water wells in sand and sand-gravel water-bearing formations. English or Spanish. Bulletin 234. Edward E. Johnson, Inc.

108. Well treatment

"Chemical Treatment for Water Wells," a three-color, illustrated folder. Layne & Bowler, Inc.

109. Water treatment equipment

Bulletin SM-1013 illustrates and describes a number of water treatment equipment items, including clarifiers, flash mixers and contactors, an automatic enclosed rapid sand gravity filter system and an eductor-type proportioning liquid chemical feeder. Process Engineers Inc., Div. of Fimco Corp.

110. Salt water stills

A 20-page booklet illustrates and describes a number of different types of salt water distilling plants, including both land type and shipborne. Diagrams show operating principles. Maxim Div., Emhart Mfg. Co.

111. Scale removal

Case histories on the removal of scale from water using equipment with "Mogul Kwik-Kleen" have been compiled by manufacturers of the product. North American Mogul Products Co.

112. Chlorinators

A 16-page booklet describes and illustrates the "V-Notch" line of chlorinators. Mechanical construction and operation of the equipment are shown in considerable detail. Wallace & Tiernan, Inc.

113. Sewage aerator

A 12-page bulletin describes "Rated Aeration" sewage treatment plants of several types. A number of specific installations are listed together with their design and performance data. A second list identifies a number of representative installations. Chicago Pump Co.

114. Sewage pumps, grinders

A four-page bulletin describes the "Flush Kleen" sewage pump and the "Barminutor" comminuting machine and lists other products of the manufacturer. Chicago Pump Co.

115. Swimming pool filter

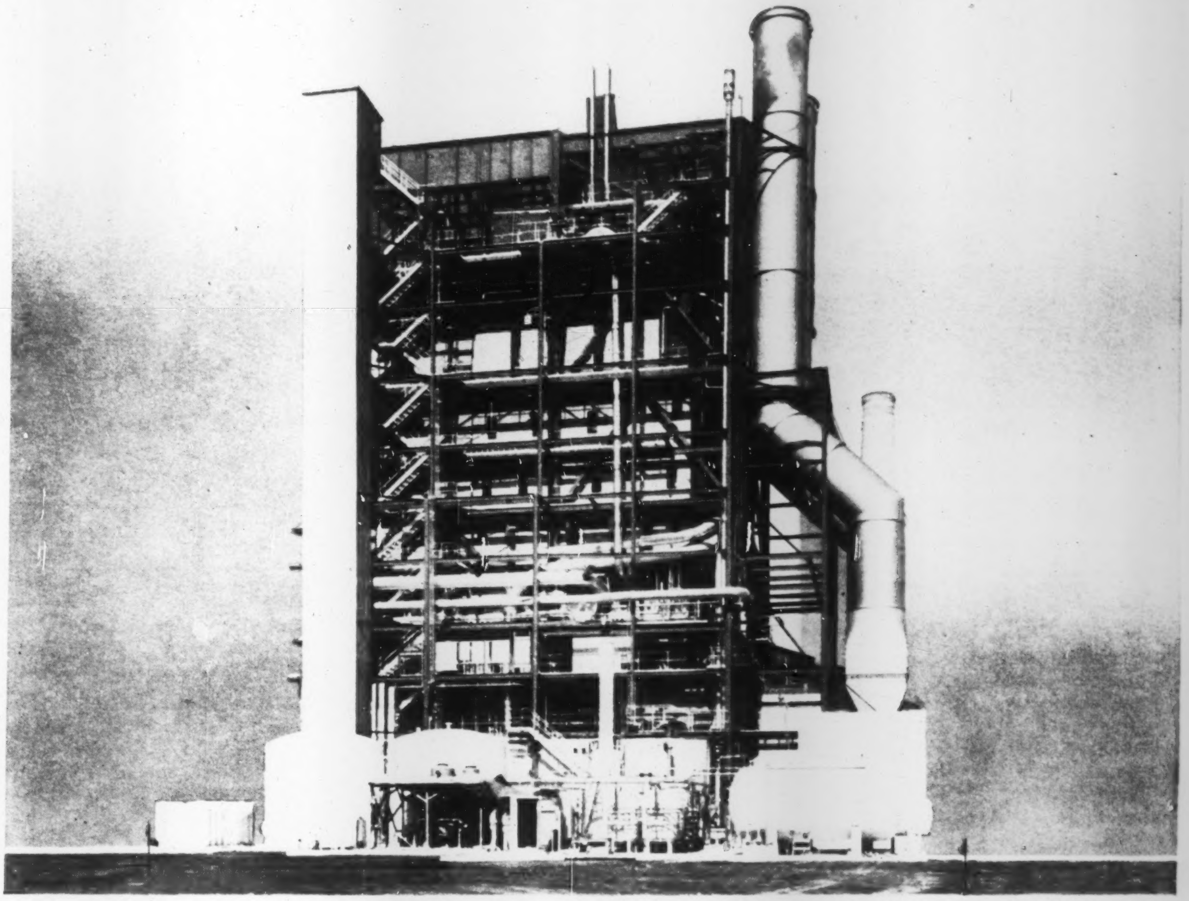
A leaflet describing the all-plastic "Proportioneers" vacuum filter for swimming pools. B-I-F Industries, Inc.

Publications continued p. 180

MEMO To: CORROSIVE ENGINEERS

From: **AVONDALE** (AVONCRAFT DIVISION)

Subject: VERSATILITY AND PORCELAIN ENAMEL



A case in point . . . porcelain enamel was used extensively in this Louisiana Power & Light Company boiler at Sterlington, La., to thoroughly weather proof it from top to bottom. The roof is of porcelain enamel, the entire sides are generally encased with this same material, and porcelain is worked into the curvatures of the pre-heaters and stack uptakes.

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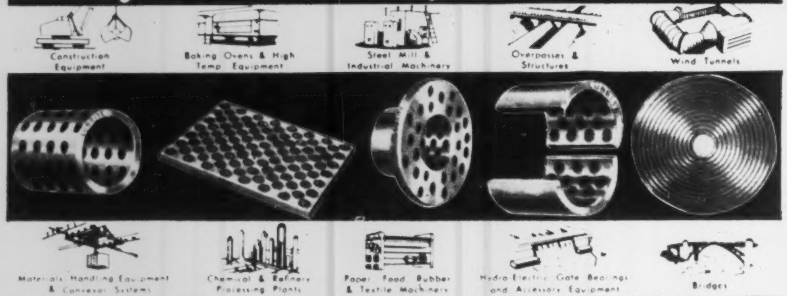
Construction Equipment
Baking Ovens & High Temp Equipment
Steel Mill & Industrial Machinery
Overpasses & Structures
Wind Tunnels
Materials Handling Equipment & Conveyor Systems
Chemical & Refinery Processing Plants
Paper, Food, Rubber & Textile Machinery
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Lubrite self-lubricating bearings offer great versatility in hundreds of fields where dependability and superior performance are of prime importance.

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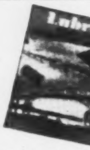

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LUBRITE DIVISION
MERRIMAN BROS., INC.
191 AMORY STREET, BOSTON 30, MASSACHUSETTS

For More Information . . .

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116. Submersible pumps

Bulletin B1200 illustrates and describes industrial submersible pumps from 3 h-p to 125 h-p, speeds 3,550 rpm., and 1,750 rpm. Sumo Pumps, Inc.

117. Submersible pumps

Bulletin No. 203 describes and illustrates Layne horizontal in-line submersible pumps for booster service. Layne & Bowler, Inc.

118. Submersible motor

Details of a 4-in. submersible electric motor designed to drive deep well turbine pumps are in Bulletin 3450. Louis Allis Co.

119. Fire pumps

A 16-page pamphlet, "Standard Fire and Low Pressure (Booster) Fire Pumps" is offered. It includes specifications, fire fitting arrangements, hose header locations, nozzle dimensions, selection chart and performance curves for all approved units. Allis-Chalmers Mfg. Corp.

120. Pumps

An illustrated bulletin, "Pumps for Nuclear Systems," tells of Peerless pump developments in this specialized field. It describes the work done on critical limited-leakage pumps for atomic-fueled submarines. Also described are pumps for atomic-powered steam generating plants, research reactors, test facilities, and similar nuclear industry applications. Bulletin PR-2. Peerless Pump Div., Food Machinery and Chemical Corp.

121. Sight flow indicators

Catalog data unit No. 350 provides information on sizes, materials, pressure-temperature ratings and dimensions of reflex and transparent sight flow indicators. Jerguson Gage & Valve Co.

122. Liquid level gages

Leaflet gives information on the construction, design features and specifications of non-frosting liquid level gages. Jerguson Gage & Valve Co.

123. Density discharge control

Bulletin V1-B1 describes the automatic density discharge control for jig hutch products and similar applications. Denver Equipment Co.

124. Low pressure meters

Information, including technical data sheets, covers a new line of lightweight portable low-pressure meters for use in open ditches, field culverts, well discharges or where temporary metering is desired. Sparling Meter Co., Inc.

125. Insulated regulators

Bulletin SRB 4-59 and Bulletin J-160 describe and illustrate the features, operating data and prices of "Thermon" jacketed regulators for use with viscose or hard to handle fluids. OPW-Jordan.

(Publications continued p. 182)

Four of Merritt-Chapman & Scott's seven 6-yd. Lima Type 2400 Shovels are shown working on the excavation site of the Niagara Power Project's main generating plant at Lewiston, N. Y.

Four contractors use 17 Limas on giant Niagara Power Project

Wherever there is a really tough job to be done—when high production, dependable heavy-duty service, rugged power, and low operating cost are essential—you are almost certain to find powerful Limas chosen for the task.

The $720,000,000 Niagara Power Project is a big job—one of the biggest. Four of the project's contractors are using a total of 17 high-output Limas on their jobs! The duty roster includes 11 big 2400's which can be used interchangeably as 6-yd. shovels, variable capacity draglines and cranes; one Type 802 50-ton crane; two 4-yd. Type 1601 shovels; one Type 1201 which can be used as a 3½-yd. shovel or 70-ton crane; and two 35-ton 54-T truck cranes.

Around the world, profit-minded contractors know from experience that it pays to buy Limas. They are quality-built throughout to deliver high production at low operating and maintenance costs.

Quality Lima Features

Here are a few examples of the superior features found in the Lima Type 2400—extra strong and rigid rotating base supported by oversize conical rollers in conjunction with double flanged heat-treated roller path and separate hook rollers; horizontal gear train and swing bevel gears are pump-lubricated in oil-tight case; anti-friction bearings are used throughout. Induction hardening of all wearing parts increases life. Crawler bushings are equipped with piston-ring type oil seals. Torque converter adjusts load speed to correspond with the resistance to moving the load—no engine stall.

Limas For Every Job

Profit with Limas—there is a type and size for every job—½ to 6-cu. yd. shovels, cranes to 110 tons crawler-mounted, 70 tons on rubber, variable capacity draglines. Investigate now! Contact your nearby Lima distributor or write us for full details.

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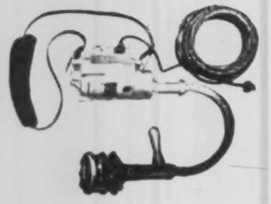

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The distinctive "BERG" features give you the kind of results that are realized in better quality work, combined with lower costs.

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126. Pump recirculation control

A pump recirculation control system to maintain safe adequate pump flow is described in 2-page bulletin No. 560. Both pneumatic and electric systems are shown. Bailey Meter Co.

127. Lightweight piping

Bulletin TT 942, "Fittings and Flanges for Light Weight Piping," gives dimensions and applications for lightweight welding fittings and forged steel lightweight taper-face flanges. Tube Turns Div. of Chemetron Corp.

128. Lightweight steel pipe

Illustrated literature on imported Swedish lightweight steel pipe for compressed air and water lines in construction and mining. Atlas Copco Pacific, Inc.

129. Water pipe

Illustrated full-page folder on welded steel water pipe deals with sizes, thicknesses, durability, testing, strength and fabrication. Armco Drainage and Metal Products, Inc.

130. Pipe data

Technical data card contains dimensions and wt-per-ft of pipe in sizes ⅛ in. through 36 in. Tubular Products Div., Babcock & Wilcox Co.

131. Aluminum pipe

Brochure contains information on Schedule 80 and Schedule 40 equivalents of "H-E" thick-jointed aluminum pipe, including data on wall thicknesses, pressures, weights and alloys. Reynolds Metals Co.

132. Stainless steel tubing

Technical data card describes high-temperature properties, chemical composition, size ranges and short-time tensile and rupture properties of B&W Croloy 25-12(309) stainless tubing, pipe and welding fittings. Tubular Products Div., Babcock & Wilcox Co.

133. Plastic liner for pipe

Four-page brochure describes the application and performance of epoxy resin liners for concrete, steel and cast iron pipe. Acid resistance, strength, bond, density and specific gravity are given. Centriline Corp.

134. Plastic pipe

Catalog sheet outlines advantages of Republic SRK plastic pipe. Describes and illustrates how to join it to either steel or plastic mains. Republic Steel Corp.

135. Rubber pipe

Brochure 7152 describes "Condor" flexible rubber pipe. Raybestos-Manhattan, Inc.

136. Asbestos cement pipe

Brochure No. TR212A on irrigating landscaped areas with "Transite" irrigation pipe. Johns-Manville Corp.

137. Pipe labels

A full-page brochure describes and illustrates color-coded adhesive pipe labels for marking pipes, cables, conductors, conduit and other items of equipment. Seton Name Plate Co.

138. Piping

"For the Life Streams of Your Building" describes the whys, whens, wheres, and hows of pipe suspension and support. 22 pages. Fee & Mason Mfg. Co.

For More Information . . .

. . . Select the publications you want and circle the key numbers on the inquiry card at the end of this section.

139. Steel pipe fittings

A 6-page bulletin describes and illustrates the "Pipe-Mate" light-wall stainless steel fittings and flanges, including long-tangent fittings, rotating insert flanges and a reversible plug and cap. Methods of joining the fittings to pipe are included. Charts give dimensions, design properties and dimensional tolerances. Tube Turns Div. of Chemetron Corp.

140. Aluminum elbows

Data sheets, samples and prices on "Gasco" humped aluminum elbows for piping systems are available from manufacturer. General Aluminum Supply Corp.

141. Pipe expansion joints

Bulletin describes and illustrates Corruflex packless expansion joints for control of all types of pipe movements. Also includes engineering and installation data with tables of forces, movements and dimensions. 72-pages. Adsco Div. of Yuba Consolidated Industries, Inc.

142. Pipe plugs

Two-page bulletin describes "Lok-Tred" pipe plugs. Lock Thread Corp.

Miscellaneous

143. Frame and rack fittings

Aluminum alloy fittings and high strength aluminum pipe for reuseable frames, racks. Two booklets 8 and 12 pages, give prices, sizes, dimensions and details of complete fitting line. Wallace Supplies Mfg. Co.

144. Computer service

Details of an electronic computing service offered at an hourly rate to engineers, businessmen and researchers and examples of these services. Statistical Tabulating Corp.

145. Electric crane controls

A 32-page two-color brochure defines design, operation and performance characteristics of a line of electrical and electronic equipment built for overhead cranes. Bulletin C5-2. Harnischfeger Corp.

146. Prestressed concrete tanks

Booklet on design of prestressed concrete tanks gives general design principles and example of design of a typical 5-million gal tank. Preload Co., Inc.

147. Proper grouting practices

Correct grouting techniques described in 16-page bulletin. Illustrates common methods of grouting equipment, mixing and placing of grout and cold- and hot-weather grouting. Bulletin Eld. The Master Builders Co.

How You Can Get More Information

In this issue ENGINEERING NEWS-RECORD is instituting a new information service center. It is designed to help you get more out of ENR by making additional information on product literature and methods easily available.

All manufacturers' publications reported carry a key number; so do advertisements. To get more information on products or services described in a publication or advertisement, just clip one of the inquiry cards, circle the number of the ad or publication you're interested in, fill out the rest of the card and drop it in the mailbox.

You'll also find a list of ENR editorial reprints available to you free (see next page). These include technical and business articles, special reports, annual surveys, checklists of the right way to do things and stories on successful products, methods and men. Reprints are also available via the new inquiry cards. Single copies of reprints are free. For quantity rates, write Information Service Center, Engineering News-Record, 330 West 42nd St., New York 36, N. Y.

This information service department will be repeated this year in the two remaining issues that will carry quarterly cost reports—September 17 and December 17.

The manufacturers' publications department, which had previously appeared more regularly in ENR, will now appear, in expanded form, only in the issues that carry the information service department.

Manufacturers' publications items are selected by ENR editors for their reader interest. Often these items offer detailed descriptions of products already introduced to readers in ENR's New Products department. The information service card thus gives you a second opportunity to catch up with products that have become available.

Reports on new products will continue to be published in each issue. Each item includes the manufacturer's name and address, for the convenience of readers who wish to write for more details. New product items are not keyed on the card.

You'll note there are two cards. The second one is for use by a friend or business associate who may read your copy.

Upon receipt of your card, ENR will make your interests known to manufacturers, who will send you the material requested. Editorial reprints, of course, will be sent to you by ENR.

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202. Jets Spark Billion-Dollar Construction Bonus—including a rundown of what has to be done at the nation's major airports.

203. What Price Colored Buildings?—Tells how to use color in buildings and what it costs.

204. How Construction Must Grow to Meet Expansion Needs—a 12-page report on challenges and opportunities.

205. Building and Housing—the latest techniques and trends.

206. Transportation—the latest techniques and trends.

207. Water Resources—the latest techniques and trends.

208. How to Anticipate Your Profits—an easily workable method, including sample work sheets.

209. Top Contractors of 1958—a list of the nation's top contract winners.

210. New Way to Make Joints in Concrete Pavement—a method that eliminates most of the problems now posed by installing, curing, cleaning and maintaining joints.

211. How to Save Money on Schools—a special feature from ENR's building cost report.

212. Where Interstate Road Work Stands—map shows various stages of work on the 41,000-mile system.

213. How to Make Old Pier Piles Good as New—describes a new method and a new grout that stays in place without forms of any kind.

214. Checklist. What Woods Make Good Pier Fenders? Compares the qualities of 52 kinds of wood.

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Men and Jobs

Maryland Names Engineer To Head State Roads Unit

John B. Funk, a practicing engineer and the son of a contractor, has been named chairman of the Maryland State Roads Commission and director of highways.

For the past eight years he has been director of public works for Baltimore County. He has served in the State Senate and in 1947 he was appointed Maryland's secretary of state.

Mr. Funk graduated from Washington and Lee University in 1926 and joined the American Bridge Co. Later he became a partner in a firm of consulting engineers, H. B. Funk & Co.

Oakland Public Works Man Retires After 35 Years

Edward W. Zeigler, assistant city engineer and ex-officio assistant superintendent of streets of Oakland, Calif., has retired after some 35 years service with the city.

During his eight years as assistant city engineer, more than $30 million worth of projects were planned and completed. These included the 12th Street Dam, the West Oakland Drainage System and Pumping Plant and the Joaquin Miller Road.

He is a member of the American Public Works Association, and in 1951 he received the association's Samuel A. Greely Award in engineering for his service to Oakland.

Robert Sumwalt Appointed President of University

Robert L. Sumwalt, who joined the University of South Carolina as associate professor of civil engineering in 1926, has been named president of the university. He has been acting president since 1957.

He studied at the University of Delaware and Massachusetts Institute of Technology. He worked with the Du Pont Co., the U. S. Public Health Service and the South Carolina State Highway Department before joining the university faculty. He was appointed dean of engineering in 1943.

Mr. Sumwalt is a past president of the South Carolina section of the American Society of Civil Engineers.

Careers

Business

Sid W. Jagger has been named executive assistant to Albert M. Cole, executive vice president of Reynolds Aluminum Service Corp. He will leave his position with the Urban Renewal Administration, Housing and Home Finance Agency. Mr. Jagger will assist Mr. Cole in expanding the uses of aluminum in the housing field.

Two Atlanta consulting structural engineering firms have merged to form **Chastain & Tindel, Inc.** F. Z. Chastain has operated a company bearing his name since 1954. L. A. Tindel was president of Morris & Tindel, Inc.

Stone & Webster Engineering Corp., Boston, has promoted two top management executives. **Fred W. Argue**, engineering manager and a vice president, was elected executive vice president of the engineering and construction organization. **Alfred L. Hartridge**, treasurer and a vice president, was elected financial vice president.

W. W. Price, Jr., president and general manager of Scott Co. of Southern California, mechanical contractors, has resigned his position. Mr. Price will form his own company in the near future. **Robert Marlin**, former project manager with the company, has been appointed manager.

Jackson & Moreland, Inc., consulting engineers, Boston, Mass., announce the following executive promotions: **Frank M. Cahart** to chairman of the board and chairman of the finance committee, **Ralph D. Booth** to president, and **Hartley Rowe** to assistant to the president and a member of the board of directors.

(*Men and Jobs continued p. 188*)

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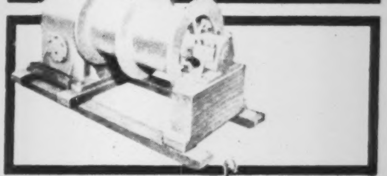

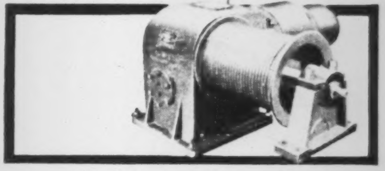

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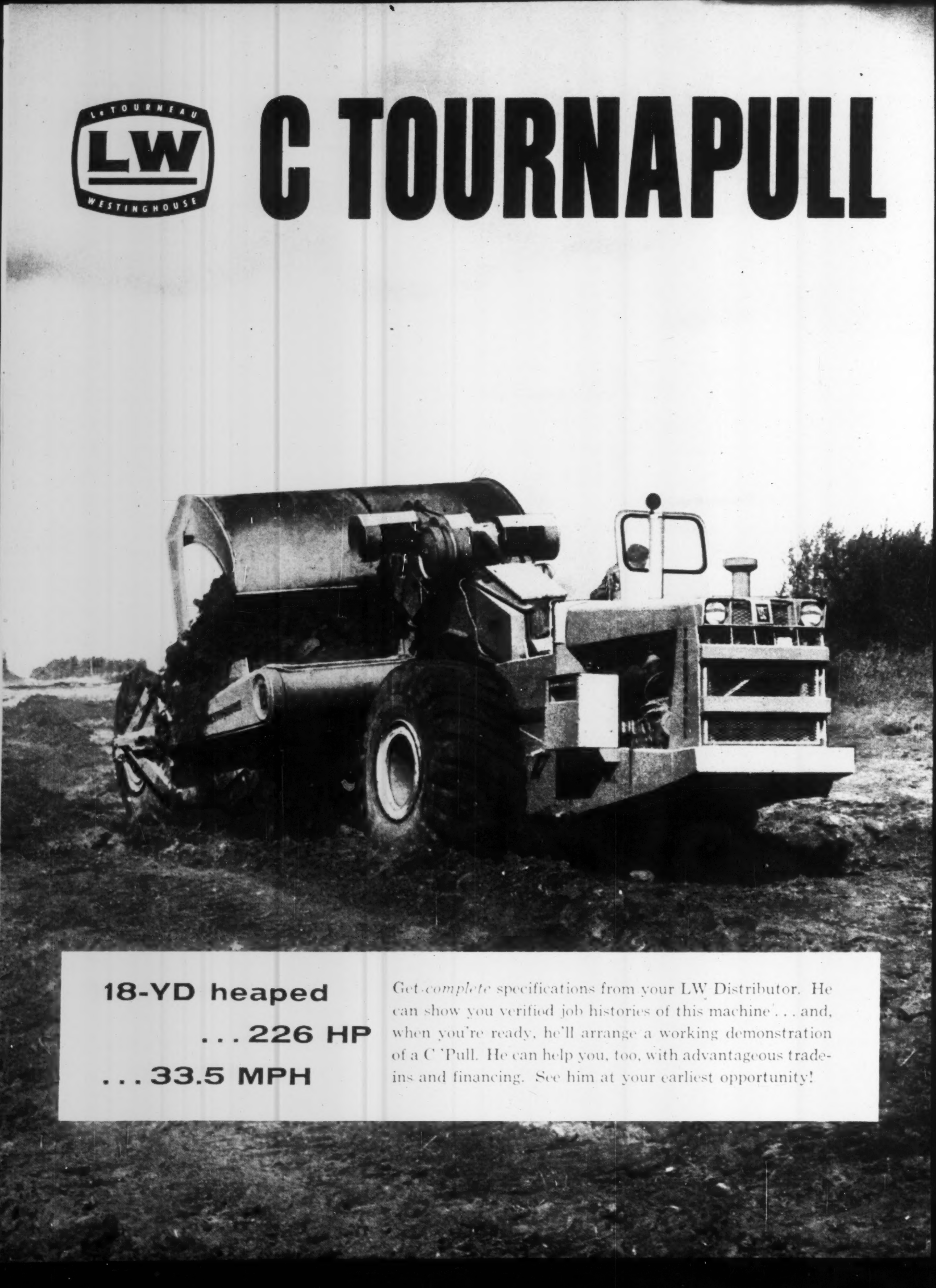

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Thousands of these high-production machines are in use around the world. Some of the reasons they've gained this tremendous acceptance in earthmoving are listed below. Review them, and you'll see why time-tested C 'Pull* is your *best* investment in medium-sized scrapers:

FULLPAK* SCRAPER DESIGN . . .
lower, wider, for better boiling action, fewer voids, bigger pay-loads per cycle.

CHOICE OF ENGINES . . .
choose either the 226-hp GM 6-71 or the 210-hp Cummins HBIS-600.

CHOICE OF TRANSMISSIONS . . .
the *only* scraper in its class that gives you a choice of step-gear transmission or a power-shift transmission teamed with low-pressure torque converter.

POWER-TRANSFER DIFFERENTIAL . . .
permits "C" to operate in slippery, muddy conditions that *stop* other scrapers.

ELECTRIC CONTROLS . . .
fast-acting, fingertip controls pinpoint accuracy, with the easiest-to-operate, easiest-to-maintain system of all.

INTERCHANGEABILITY . . .
exceeds any other make of scraper, with Rear-Dump, Bottom-Dump, and Flatbed haulers interchangeable, at low cost, behind the Tournapull prime-mover.

GREATER SAFETY . . .
with the biggest brakes in the industry, superior visibility, *instant* electric control and power steer that is not affected by the operation of any other controls.

MORE MANEUVERABILITY . . .
electric king-pin steer can U-turn C 'Pull in less than its own length, for fast, easy maneuvering in tight quarters, narrow haul roads.

LOW OPERATING COSTS . . .
you save money *every day* because of the features listed above, plus "C's" simple, rugged design, easy accessibility of component parts, minimum of lubrication points, and low requirements for fuel, cable, oil, and tires.

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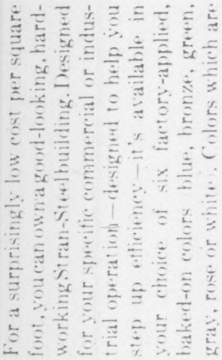

Lengths in 24' or 20' multiples and a full range of widths—with spacious column-free interiors.

For a surprisingly low cost per square foot, you can own a good-looking, hard-working Stran-Steel building. Designed for your specific commercial or industrial operation—designed to help you step up efficiency—it's available in your choice of six factory-applied, baked-on colors (blue, bronze, green, gray, rose or white). Colors which are handsome themselves, and blend beautifully with brick, stone, wood or glass.

The low price of an efficient, good-looking Stran-Steel building is made possible by precision mass production. Owning one almost always costs less than rent payments for similar space. Our five-year purchase plan, which requires an initial investment of only 25%, can be handled by your Stran-Steel dealer, who will also take responsibility for planning and construction, if you like. For full information, mail the coupon or call the Stran-Steel dealer listed in the Yellow Pages under *Steel Buildings* or *Buildings-Steel*.

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DEALERS EVERYWHERE

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Arthur V. Peterson, nuclear engineer, has resigned as vice president of AMF Atomics, a division of American Machine & Foundry Co., and of AMF Atomics (Canada) Ltd., to establish Arthur V. Peterson Associates. The new firm will provide atomic energy consultation to industrial management and will be headquartered in Westport, Conn.

Richard C. Niblack has been promoted from chief designer to director of design at Charles Luckman Associates, planning-architectural-engineering firm, Los Angeles.

Two executive appointments were made at the Pittsburgh headquarters of United States Steel's American Bridge Division. **R. A. Moulton,** formerly senior assistant to the vice president, manufacturing operations, is now director of production planning. **G. L. Martin,** formerly plant manager of American Bridge's Orange, Tex., plant is now assistant to the vice president, manufacturing operations.

G. W. Carlson has been made general manager, and **R. W. Maxwell,** assistant general manager of Continental Can Co.'s construction engineering division, headquartered in Chicago. Mr. Carlson replaces **John Fedosky,** who is retiring after 41 years of service with the company.

Beaumert Whitton, former vice president of the Southeastern Construction Co., Charlotte, N. C., has been named president of the company, succeeding his father, **Earle Whitton,** who retains his post as chairman of the board. Other staff changes for the firm, which operates throughout the southeast, are: **F. M. Sewell,** named senior vice president and secretary; **John W. Whitton,** named vice president and treasurer; and **Edward L. Whitton,** named vice president and assistant secretary.

The Cleveland architectural firm formerly known as Ward & Conrad, has added two new partners **G. Fritz Schneider** and **Eugene J. Szabo.** The firm will have the name, Ward, Conrad, Schneider & Szabo.

Raymond B. Aufmuth, has been appointed chief engineer of the H. K. Ferguson Co., Cleveland industrial engineers and contractors. Mr. Aufmuth, with Ferguson for 11 years, has been staff engineer in the Cleveland office. In 1954 he went to England as chief engineer of H. K. Ferguson Co. of Great Britain, Ltd. He returned here in 1956 as chief mechanical engineer of the company's central district.

Stevens & Thompson, consulting engineers, Portland, Ore., has admitted **Ray F. Charles** as a general partner. He will head the Seattle office.

(*Men and Jobs continued p. 190*)

MODEL C
TOURNATRACTOR

This big tractor has the power, weight, and traction to handle most of your dozing, pushing, and pulling assignments . . . plus the easy-rolling advantage of big rubber tires that take it anywhere, over any surface, under its own power. It does more work, in less time, at big savings in operating, maintenance costs.

SPEED is your answer for widely-scattered tractor work

If your tractor assignments call for a machine that can go to work anywhere . . . anytime . . . without expensive delays waiting for haul equipment . . . check on mobile, rubber-tired, 218-hp Tournatractor®.

This LeTourneau-Westinghouse tractor-on-rubber can *drive* to the next pulling, pushing, or dozing job at a moment's notice. It moves along highways, city streets, or cross-country . . . through sand and mud . . . at speeds to 17 mph. On the highways, it rolls fast enough so that it will not interfere with traffic.

L-W tractor's wide, low-pressure tires straddle railroad tracks, safely cross trestles and bridges. You need no extra manpower, no special transport equipment.

Handle long dozing cycles efficiently . . . economically

Once on the job, Tournatractor's fast work-speeds on rubber step-up operations . . . make long dozing, pushing, or scraper-operating cycles practical and profitable.

Pick-up is fast, because of L-W tractor's sealed, anti-friction, 4-wheel drive. Air-actuated power-shift transmission allows operator to shift gears on the run, losing no momentum. Even reverse shift is instant.

Electric controls — simplest system of all

Another big advantage of the Tournatractor is its simple operation. Even untrained men become good operators in a very short time.

Tournatractor's electric controls are easy-to-understand, easy-to-reach. One-hand, one-motion clutch-less shifting . . . plus the many safety features . . . mean men will use higher speeds more often.

Call or write us for details on fast-stepping, "go-anywhere" Tournatractor. Ask us to show you the L-W rubber-tired tractor in action on assignments of your choice.

CT-1902 DC-1

LW

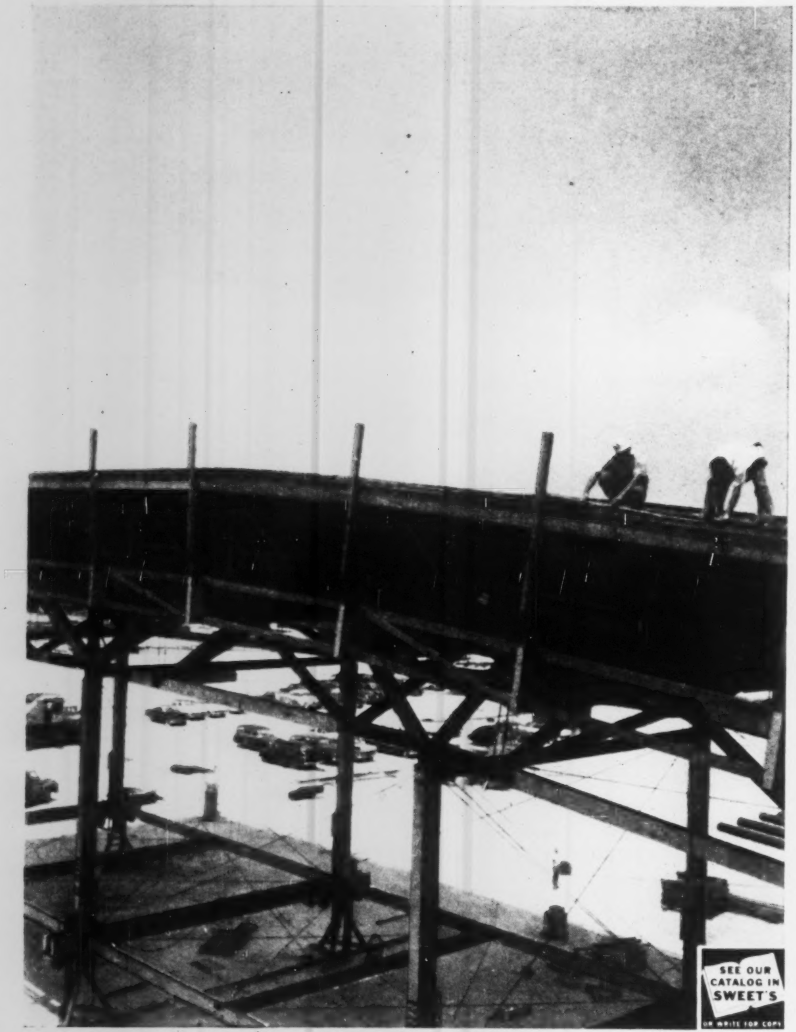
LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Formwork at TWA hangar, New York International Airport, New York City. Structural engineers: Ammann and Whitney, New York; mechanical and electrical engineers: Burns and McDonnell, Kansas City, Missouri; general contractors: Grove, Shepherd, Wilson & Kruge, Inc., New York.

Space provided: overall dimensions of 412′ x 821′, divided into a central core structure of 80′ x 821′, and concrete shell sections of 166′ x 821′ on either side. *Roof:* reinforced concrete slab of 4¾″ average thickness with folded plate corrugations every 30′. Roof is supported every 30′ at outer edges by four 2½″ tension cables connected at top of central core section by a tension tie to equalize loading on both sides. *Falsework structure:* two traveling sections, each 60′ by 166′ in size. Each section consists of two parallel chord trusses and glulam floor beams which support the folded plate roof framing. *Procedure for moving forms:* after concrete roof sections had hardened to 2500 p.s.i. tension cables were tightened to support the section, and falsework was lowered onto rails by hydraulic jacks. After being moved into position for next pour, falsework was placed upon tripod sand jacks which provide support until the next move.



In forming concrete shell buildings, pre-fabricated falsework by Timber Structures, Inc. provides maximum accuracy as it reduces construction time and costs. Absolute safety of a thoroughly engineered structure is a bonus.

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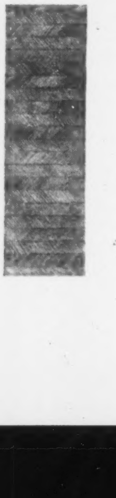


. . . Men and Jobs

Amedeo Leone has been elected president of Smith, Hinchman and Grylls Associates, Inc., Detroit architectural and engineering firm, following the retirement of Wallace S. Mackenzie. Mr. Leone joined the company in 1915.

Libbey-Owens-Ford Glass Co. has elected six new vice presidents. The new officers are: **Harold M. Alexander**, for technical services; **Horace G. Orser**, for special products production; **Clinton F. Hegg**, for sales; **A. P. Plant**, for industrial sales; **E. R. Pierce**, for distributor sales; and **James M. Ashley**, for public relations.

George E. Bell has been appointed head of the laboratory and testing department of the Engineering Office of Clyde C. Kennedy, San Francisco. Since he joined the Kennedy firm in 1951 he has developed a number of water supply and treatment projects in western United States, Alaska, Guam, Saipan, the Philippine Islands and Formosa. The department he heads coordinates laboratory and testing work for development of design criteria; water, sewage and industrial waste treatment plant control; and research and process development. His assignment includes treatment plant operator and chemist training.

Yuba Consolidated Industries, Inc., San Francisco, has established Yuba Consolidated Erectors, Inc. The new division will perform on a national basis all field erection work for Yuba's heavy steel fabricating divisions.

B. Raymond Sayer has been appointed manager of The Austin Co., Ltd., with offices in Montreal and Toronto. Mr. Sayer has been engaged in plant location survey work for industrial and process plants with the Austin Co. since 1948.

Magney, Tusler and **Setter**, Minneapolis architectural and engineering firm, is now Magney, Setter, Leach, Lindstrom and Erickson, Inc. Principals in the new firm are John R. Magney, Donald P. Setter, Stowell D. Leach, John Lindstrom and Hugo Erickson. Mr. Erickson recently resigned as Minneapolis city engineer. Wilbur H. Tusler has retired as a principal.

Walter W. Saxton, former chief engineer of the Washington State Pollution Control Commission, has joined the Seattle office of Stevens & Thompson, consulting engineers. He is manager in the general field of utility design.

O. P. Seim has joined Stevens & Thompson, Seattle consulting engineers, as a supervising engineer in the mechanical and hydraulic engineering department.

(*Men and Jobs continued p. 195*

Cape Constructors' D 'Pull operator, Steve Yarema, says units are "fine for work on housing jobs. Electric controls are simple to operate and the machines are a cinch to maneuver."

LeTOURNEAU-WESTINGHOUSE
TOURNAPULL

LW earthmovers speed start of air base housing project

Construction of an urgently needed second 500-home military housing project at Dover Air Force Base, Del., was given a fast start by Hart Constructors of Dover. A joint venture made up of Terminal Construction Corporation of Wood-Ridge, New Jersey and Frouge Construction Co., Inc. of Bridgeport, Conn.—largest builders of military Capehart housing in the nation. The firm handled site preparation with five high-speed LeTourneau-Westinghouse earthmovers—four 29.5-mph D Tournapulls* and a 26-mph LW Adams* 660 motor grader.

On cycles about a mile long, the four 138-hp 'Pulls* averaged a total of 50 loads of gravel per hour. Material was spread as base for temporary construction buildings and parking lots. The 160-hp grader ranged the spread, cutting and maintaining haul and access roads and smoothing scraper-spread gravel on the fill in its spare time.

"Practically no lost time"

Administrator Jack Chasin reports that the dependability of the "660" and D 'Pulls was outstanding, and a real help in keeping the operation on schedule. "There was practically no lost time for repairs," he says, "and operating costs were low."

High-speed LW units can cut your costs, too. See the heavy-duty "660" grader and high-production D Tournapull at work. Ask for a demonstration.

"It's easy to keep ahead of scrapers on the fill with this grader," reports John Ratledge, operator of Cape Constructors' Adams 660. "It's got plenty of power, easy handling controls, and I have a good view of the blade all the time."

*Trademark GDP-2035-DCJ-1

LW **LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

OKLAHOMA INTERSTATE 40 TAKES SHAPE FAST:

Haskins Beats Schedule on Four Consecutive Contracts

Ben Haskins, Cordell, Oklahoma, contractor, finished his fourth contract on Interstate highway 40 in Oklahoma 35% ahead of schedule. The first three were handled with similar speed. Interstate 40 is a new four-lane, controlled access highway which, when completed, will link Los Angeles, California, and Durham, North Carolina, with connecting Interstate routes to the Atlantic Coast. On his fourth contract—a 1,200,000-yd, $497,000 job at the west edge of Clinton, Oklahoma—Haskins timed his Allis-Chalmers motor scrapers at 7.5 minutes per 3.26-mile cycle. Deducting 30 seconds for loading, Haskins had 7 minutes left for travel and spreading . . . a remarkable 27.7 mph average. These units are rated conservatively by Allis-Chalmers at 27.9 mph in fifth gear.

About 50% of the hauling was upgrade . . . averaging 3%. The motor scrapers had to negotiate a 15-ft dip from haul road level to detour around a bridge. The TS-260's took this detour in fifth gear. Another 2,000 feet of the haul road passed through a business district in suburban Clinton on existing Route 66. Regular traffic was maintained.

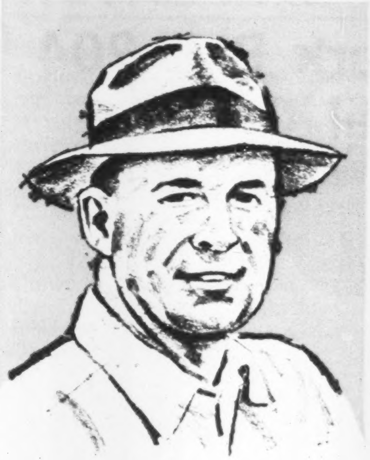
The Oklahoma Interstate 40 jobs handled by Haskins called for loading sandy clay, sandstone and shale. Most of it was ripped for fast, efficient loading. Two unusual cuts were encountered—55 and 65 feet deep, 1,000 feet long and about 400 feet wide at the top.

To handle jobs like this in less than scheduled time takes top-notch equipment. Haskins is proving he has it. His selection of motor scrapers was made after he timed loading cycles, scaled loads and recorded travel speeds to determine comparative yards moved per hour by the three leading makes. He chose Allis-Chalmers TS-260 motor scrapers. The rest of his fleet, all Allis-Chalmers, was selected just as carefully.

Ben Haskins' extreme dedication to detail both in the planning of his jobs and the selection of equipment has been rewarded with fast . . . yet solid growth for his 13-year-old company. Haskins personally checks every job to be bid . . . every machine to be considered for purchase. The unusual efficiency of his operations and

Part of Haskins' Allis-Chalmers fleet is shown in a big cut on one of his early Oklahoma Interstate 40 jobs.

...move ahead with



Ben Haskins, Contractor
Cordell, Oklahoma

equipment helped him complete his Interstate 40 contracts 35% ahead of schedule . . . has earned him the healthy respect of his fellow contractors who have to bid against him.

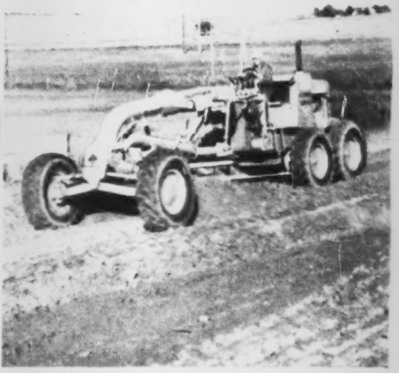
Haskins figures on . . . and gets better than 90 per cent availability of equipment during the 270 ten-hour working days he averages each year. You are entitled to performance like this on your jobs. You'll get it with Allis-Chalmers construction machinery. Your dealer has the equipment, facilities and know-how to put you out in front of your schedules. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Allis-Chalmers Equipment Used by Haskins on Interstate 40 Contracts

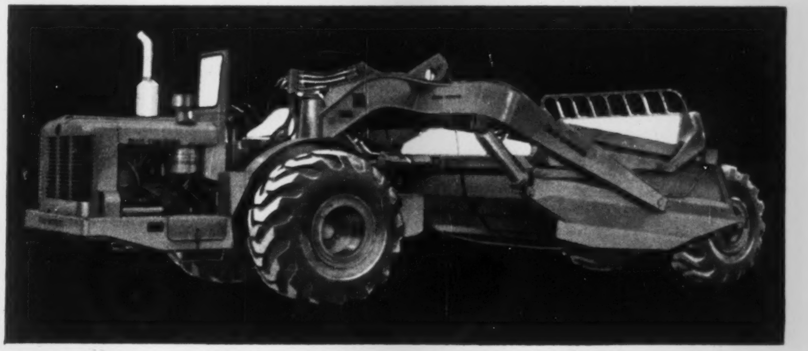
- TS-260 motor scrapers
- HD-21 crawler tractors
- HD-16 crawler tractors
- HD-11 crawler tractor
- HD-11G tractor shovel
- FORTY FIVE motor graders

Some of Haskins' new TS-260's loading tough clay, sandstone and shale. The material was ripped for most efficient handling.

Averaging a remarkable 27.7 mph on the haul, these Allis-Chalmers motor scrapers completed 3.26-mile cycles in 7.5 minutes.



Allis-Chalmers FORTY FIVE motor graders maintained fill and haul roads . . . helping motor scrapers make high speed cycles.



TS-260 230 hp, 17 yd heaped, 44,800 lb

ALLIS-CHALMERS ...power for a growing world

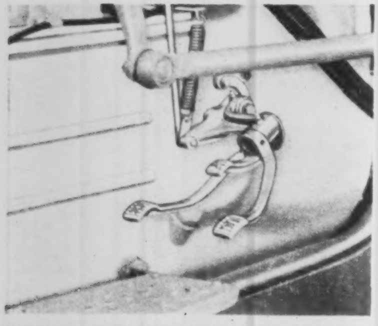
the NEW Massey-Ferguson Work Bull 204 has Pedal Directional Control

the only 40-h. p.
Industrial Tractor
with Instant Reverse
and Torque Converter

IN...

LOAD...

OUT...in seconds



PEDAL DIRECTIONAL CONTROL

Massey-Ferguson's exclusive instant reversing and speed are controlled by this simple 3-point combination directional acceleration pedal. Right pedal — forward left — reverse. The farther you depress each pedal the faster you go. Changes directions instantly, smoothly. Center pedal is foot accelerator to speed loading and dumping.

SEE IT...TRY IT... to really learn the benefits of this powerful, new Massey-Ferguson Work Bull 204. Faster cycling, unmatched maneuverability, greater earning power are a few.

A simple touch of your toe on the 3-point pedal control changes your direction of travel; determines your speed, or lets you "rev" up the engine for faster loading or dumping. Four equal speeds in each direction — "job engineered" to meet every work requirement — lets you select the speed you need for each particular job. Torque converter automatically adjusts power to load demands. *No shifting . . . no clutching . . . no levers to pull.*

With the new M-F Davis Loader, integrated with the Work Bull 204, you have a rig that can't be beat — no matter what comparison you use. For an all-around unit, add the M-F Davis Backhoe or Scarifier-Scraper . . . *you'll be in business for profit!*

A DEMONSTRATION WILL PROVE IT
CALL YOUR M-F INDUSTRIAL DEALER NOW

M F

MASSEY-FERGUSON INDUSTRIAL DIVISION
BLOCK 1000 SOUTH WEST STREET • WICHITA 13N, KANSAS

Richard R. Kennedy and **Robert M. Kennedy**, San Francisco consulting engineers specializing in sanitary engineering, have changed the name of their partnership to Kennedy Engineers. For some 40 years the firm had been called the Engineering Office of Clyde C. Kennedy, for the senior Mr. Kennedy, who passed away a few years ago.

J. D. Wilson, formerly with the Girdler Construction Division of Chemitron is now project manager for Christopher Construction Co., Columbus, Ohio.

Thomas A. Lang, an Australian engineer specializing in hydroelectric development, has joined Bechtel Corp., San Francisco engineers and constructors, as an executive engineer in the power and industrial division.

M. Scott Dickson, an engineer in the industrial division of W. & L. E. Gurley Co., manufacturers of surveying equipment in Troy, N. Y., has been elected a vice president of the firm. He is a former colonel and associate professor in the U. S. Military Academy's department of military topography and graphics.

Marshall Wetzel and **Delbert Aldredge** have been elected assistant vice president of the C. & C. Construction Co., Fort Wayne, Ind.

Zebulon V. Stewart will retire as highway engineer of the Ninth Division of the North Carolina State Highway and Public Works Commission to become chief engineer of the W. F. Graham & Sons Construction Co., of Cleveland, Ohio, and Winston-Salem, N. C.

John F. Davidson has been elected a vice president and a director of the Arundel Corporation, of Baltimore. He succeeds the late S. Bonsal Brooks.

Caswell U. Forrest has joined the Universal Grading Co., Inc., of Albuquerque, as general manager and executive vice president. He was formerly a vice president of the Robert E. McKee Contracting Co., of El Paso, Texas.

J. Kenneth Koster, construction manager of B. F. Goodrich Chemical Co., has been named manager of production and engineering of the company's chemical plant in Calvert City, Ky.

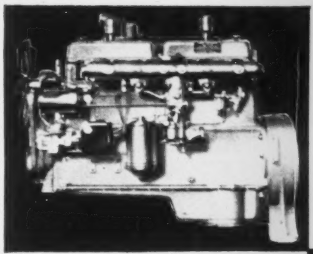
Carl B. Cunningham, former assistant district engineer of the Illinois Division of Highways, has joined the National Corrugated Metal Pipe Association as division engineer for Illinois.

William J. Wallace, recently retired engineer of streets for the city of Detroit, has been appointed asphalt paving consultant for the Michigan Asphalt Paving Association in the Detroit metropolitan area.

(*Men and Jobs continued p.* 196)

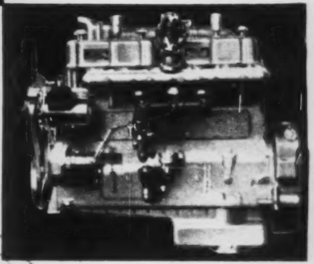
for VERSATILITY

MARION TRUCK-CRANE
with two
WAUKESHA
ENGINES



Powering the Carrier—145-GKB Waukesha Gasoline, six cylinders, 5¼-in. x 6-in., 779 cu. in. displ.

▲ Powering Crane (boom)—140-GK Waukesha Gasoline, six cylinders, 4½-in. x 5½-in., 525 cu. in. displ.



Leonard Bros. Transfer of Miami—one of Florida's largest truck-crane users—has worked a wide variety of jobs quickly *and profitably* with their Marion Type 43-M mobile truck-crane. The upper frame has a Waukesha 140-GK Engine and Twin Disc torque converter; the Henderson Carrier has a 145-GKB Waukesha Engine. The truck crane is shown unloading a 2700 hp Diesel engine from railway flat cars to carry-all truck, later unloaded at power plant in Sebring, Florida. The huge engine with its two components, weighing 34½ tons and 31½ tons, took two separate lifts. Seven parts of line were used with the 43-M's basic 30 ft. boom working at a close radius. Get Engine Bulletins 1548 and 1553.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
NEW YORK TULSA LOS ANGELES
Factories — Waukesha, Wisconsin, and Clinton, Iowa
431

WISCONSIN
parts and service
conveniently
available...
AT ANY TIME

Let's face it — even Wisconsin heavy-duty air-cooled engines need service and parts occasionally! This honest approach has an equally realistic stop-gap — the ever-ready network of authorized Wisconsin service stations where parts and service are available on a moment's notice. As a result, you're never caught with your engines down for long because Wisconsin service is as near as your telephone.

You can rely on expert service by Wisconsin-trained personnel. Most of them are graduates of periodic service clinics and are thoroughly familiar with the design, construction, and operation of Wisconsin engines. Each service station — whether it's in Fairbanks, Topeka, or Mozambique — has a stock of Wisconsin parts to assure fast delivery — to put your equipment back in service with minimum delay.

Wisconsin heavy-duty air-cooled engines are known, used, and respected throughout the world. So are the more than 2000 authorized Wisconsin service stations and their work. You can rely on both to keep your work loads "on-schedule" anywhere, at any time! Write for Form S-198 which lists all the authorized Wisconsin service stations throughout the world.

Over 2000 authorized WISCONSIN service stations are on call if and when you need service!

WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

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CIRCLE I-5 READER SERVICE CARD

DUDGEON HYDRAULIC JACKS
SALES • RENTALS
CAPACITY TO 600 TONS
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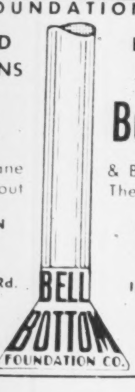
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Public Works

R. B. Fitzgerald has been promoted from assistant division engineer to division engineer of the Ninth Division of the North Carolina State Highway Commission.

Frank X. Burke, Jr. has been appointed acting equipment engineer in charge of the Pennsylvania Department of Highways equipment bureau in Harrisburg.

John Lovell has resigned from the Ohio Department of Highways to become right-of-way engineer for the Toledo-Lucas County Expressway System.

Arvid Karkkainen has been promoted from deputy city engineer of Rochester, N. Y., to city engineer.

Robert M. Leary, former staff assistant to the chief of the planning division of the Port of New York Authority has accepted an appointment as planning director of Ann Arbor, Mich.

Felix D. Geissler has joined the Pennsylvania Department of Highways and will serve as director of electronic processing.

Hal A. Aitken, former special assistant to the director and chief engineer of programming and planning of the District of Columbia has been appointed director.

Richard N. Hay, assistant city engineer for Cudahy, Wis., has been appointed to the newly-created post of City Engineer for Oak Creek, Wis.

A. C. Husband, U. S. Navy Civil Engineering Corps, has been appointed district public works officer, First Naval District in Boston.

James F. Sheridan has been named public works commissioner of Amsterdam, N. Y. He takes over the post from Albert H. McCaffrey.

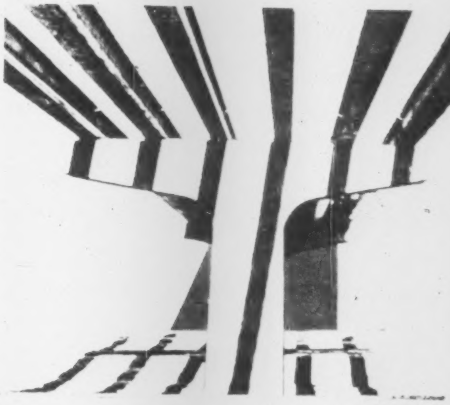
Col. Howard W. Penney will replace Col. John D. Bristor as head of the Tulsa District, Army Corps of Engineers, this July. Col. Bristor will report to Fort Leonard Wood, Mo.

Philip E. LaMoreaux, former division hydrologist, mid-continent area of the water resources division of the U.S. Geological Survey, has been named chief of the Survey's ground water branch. He succeeds **A. Nelson Sayre.**

Capt. Frank L. Endebrock, Civil Engineer Corps, USN, has relieved **Capt. Jule C. Tate** of CEC at the New Orleans Naval Station as district public works officer. Captain Tate is transferring to Washington, D. C.

Harry Overton has been appointed acting director of the Engineering Division of the Savannah River Operations Office of the U. S. Atomic Energy Commission, Aiken, S. C.

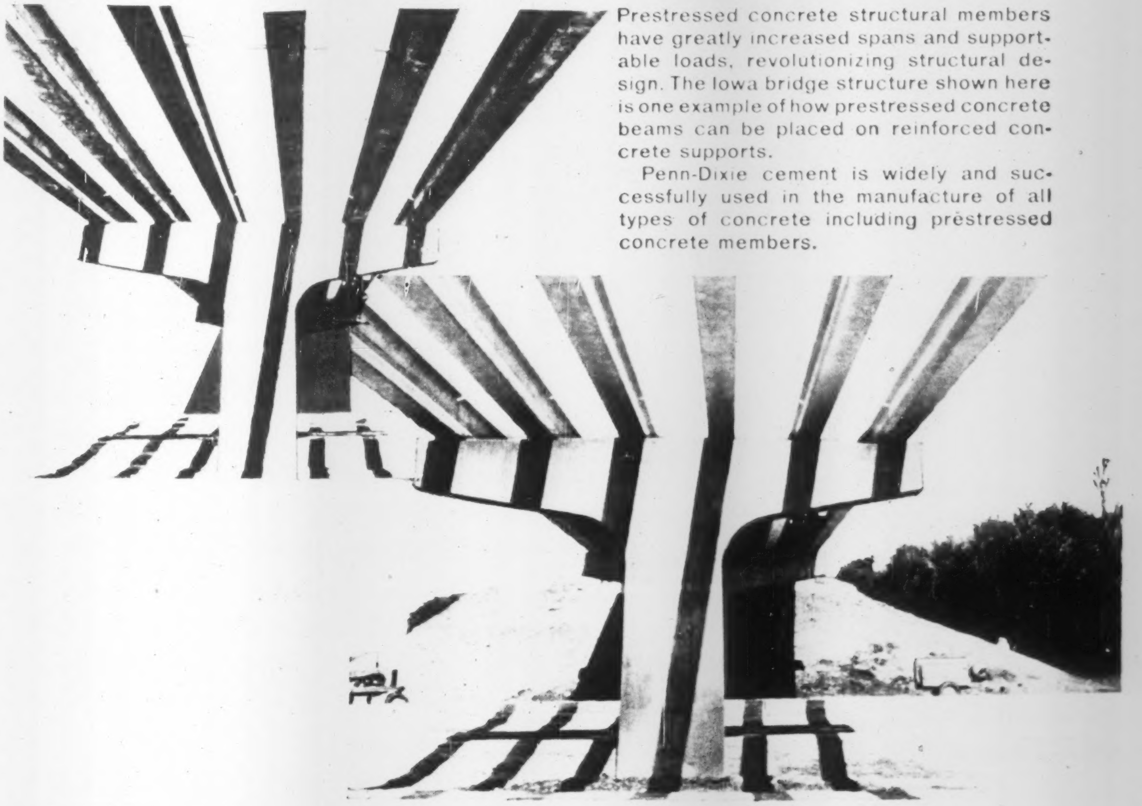
(*Men and Jobs continued p. 200*)



PRESTRESSED CONCRETE AND PENN-DIXIE CEMENT

Prestressed concrete structural members have greatly increased spans and supportable loads, revolutionizing structural design. The Iowa bridge structure shown here is one example of how prestressed concrete beams can be placed on reinforced concrete supports.

Penn-Dixie cement is widely and successfully used in the manufacture of all types of concrete including prestressed concrete members.



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Penn-Dixie means Permanent Dependability

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Form ANY type of

FASTER... EASIER

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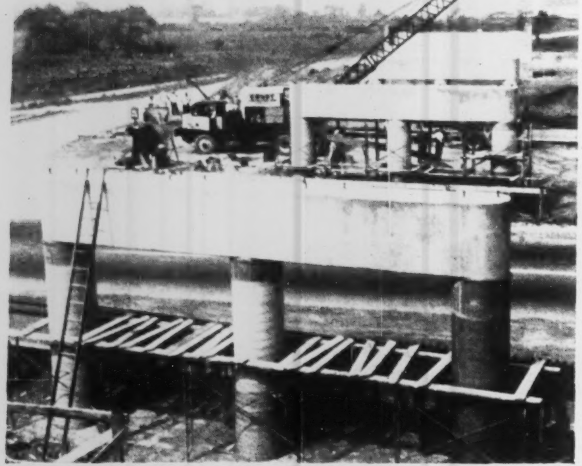
FIBRE FORMS

For forming round concrete columns under widely varied conditions, Sonoco manufactures FIVE distinct types of SONOTUBE Fibre Forms. By selecting the one best suited to the requirements of the job, contractors can form the round concrete columns faster, easier, and at less cost than by any other method.

SONOTUBE Fibre Forms are designed for use in bridge and overpass piers, buildings, schools, or wherever round columns of concrete are to be formed. They can also be used for obround, half-round or quarter-round columns, and pilasters.

Because they are lightweight, easy to handle and place, strip quicker and require only minimum bracing, Sonoco SONOTUBE Fibre Forms save contractors time, labor, and money. Approved by architects and engineers, SONOTUBE Fibre Forms are used successfully by contractors everywhere.

Order SONOTUBE Fibre Forms in specified lengths or standard 18′ shipping lengths . . . . sizes from 2″ to 48″ I.D. Can be sawed with a conventional carpenter's saw.



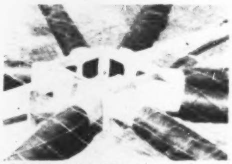
N.Y. State Thruway

Henry Ford Comm. College

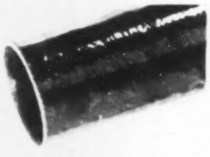
round concrete column
...at LESS COST...

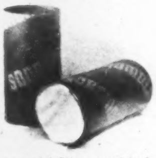
5 TYPES OF SONOCO SONOTUBE FIBRE FORMS

1. **Seamless** (pat. pend.) — A premium form for finished columns; produces a smooth, continuous surface and reduces finishing time.
2. **"A" Coated** (patented) — Standard form for exposed columns. Provides "wet" cure for concrete — permits painting or plastering of stripped column. (For extra economy, use Light Wall "A" Coated for columns not exceeding 10′ in height.)
3. **"W" Coated** — A wax coated form for columns where stripping is not required or finished surface not desired. (For extra economy, use Light Wall "W" Coated for columns not exceeding 10′ in height.)
4. **Dry Ply** — To encase existing columns, piles, piers, posts and utility lines with concrete — for use where the form cannot be slipped over the top of the member to be encased.
5. **Special** — Forms constructed for use in water or in excessively damp places are available on special order.


SONOAIRDUCT Fibre Duct for slab perimeter heating

DUROPIPE Bituminized Fibre Pipe—regular or perforated


Pitch Impregnated Fibre pipe in sizes to 36" I.D.


Sonomold Fibre Molds for concrete test cylinders.

And to form voids in concrete construction—use low cost, easy-to-handle

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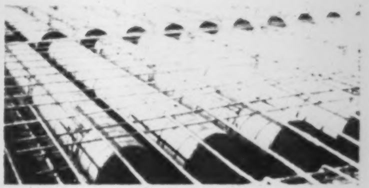
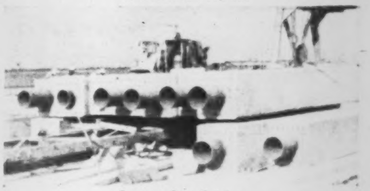
By displacing low-working concrete at the neutral axis, Sonovoid Fibre Tubes reduce weight in concrete floor and roof slabs, bridge decks, and in precast, prestressed concrete piles. The voided system saves concrete and reinforcing steel while increasing design flexibility.

Order Sonovoid Fibre Tubes in sizes from 2.36" to 36.9" O.D., in specified lengths or standard 18′ shipping lengths. Can be sawed at the job . . . end closures available.


La Clede Overpass


Tampa Bay Bridge

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Engineered to exacting industry requirements, Sonoco Fibre Construction Products are subject to rigid quality control through every step of manufacture. Backed by over 60 years of Sonoco experience, these products speed construction, save labor and materials, and permit new design and structural features.

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Construction Products
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OWEN
BUCKETS

new center line reeving
doubles cable life

"Our new OWEN Bucket is great. That new center line reeving more than doubles our cable life," says Kenneth Muster, Supt. for R. F. Muntz, owner of the Hugo Sand and Gravel Co. of Kent, Ohio.

The tandem positioning of the lower closing sheaves permits the closing line lead to pass directly through the center of the head of the bucket. This exclusive OWEN feature eliminates excessive bending of the cable, resulting in increased cable life experienced by Hugo Sand and Gravel. It also permits the bucket to hang plumb from the crane boom.

"Our operation is tough on a clamshell, but all these improved OWEN features have greatly reduced our maintenance costs and cut down-time," claims Mr. Muster.

This OWEN Clamshell, with all moving parts lubricated . . . with all arm and sheave pins, plus the main shaft, having triple lip grease seals . . . has heavily cut the high maintenance expense of handling this sand suspended in water that comes directly from the wash plant.

Send us your requirements.
OWEN Engineers are at your service at all times.

The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
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. . . Men and Jobs

J. Philip Richley has resigned as assistant city engineer at Youngstown, Ohio, in charge of street and bridges to join the Ohio Department of Highways as division construction engineer of Division 4.

Francis E. Twiss, former engineer advisor of the Associated General Contractors of America, has become deputy director of traffic engineering and operations of the District of Columbia Department of Highways.

Robert P. Hamilton has been promoted by the Oregon State Highway Commission from Salem Division office engineer to utilities permit engineer in the Permit Division. He is succeeded by **John G. Canfield.**

Col. Oran O. Price has been assigned to Randolph Air Base, Tex., as deputy chief of staff for installations at Headquarters Air Training Command.

Edward D. Hubbard, former assistant engineer of the Fredericksburg district of the Virginia State Highway Department, has been promoted to district engineer of the Richmond district.

Sidney G. Spencer, resident engineer at Bowling Green will become assistant district engineer at Fredericksburg and **Arthur B. Johnson, Jr.,** resident engineer at Petersburg, will transfer to Bowlin Green.

Col. J. R. White has been promoted from lieutenant colonel and transferred from the Air Force Academy Construction Agency, Colorado Springs, Colo., to Ranoldph Air Base, Tex., as director of facilities support.

Col. Samuel R. Young, Air Force civil engineer, has been assigned to Headquarters Air Defense Command, Ent Air Force Base, Colo., as deputy installations engineer.

Charles W. Cook, Jr., has been appointed executive director of the Indiana Toll Road Commission. He succeeds **Albert J. Wedeking.**

Col. Richard P. Davidson has been named district engineer of the U. S. Corps of Engineers at Wilmington, N. C. He replaces **Col. Henry C. Rowland, Jr.,** district engineer since 1956. Major Leonard Edelstein has been assigned to the Wilmington district as deputy district engineer, replacing Lt. Col. W. K. Shaffer.

Russel S. Thomson has been named district engineer for the Fort Wayne area by the Indiana State Highway Department. He succeeds **Charles D. Miller,** who has become assistant superintendent of maintenance of the department.

E. G. Singletary has been elected chairman of the North Carolina Licensing Board for Contractors. **R. A. Bryan** was named vice chairman.

(*Men and Jobs continued p. 204*)

new heavy duty MUELLER® CHECK VALVES

Specifically designed for repeated opening and closing applications.

■ These new, heavy duty Water Works Check Valves have been specifically designed to reduce wear caused by repeated opening and closing when used in such installations as pump suction or discharge lines. ■ All working parts are heavily constructed from high-strength materials to assure long, dependable operation without maintenance. A new combined hinge pin and plug is held to the body by studs and nuts. An "O" ring positively seals the plug to prevent leakage. Large, wear-resistant bearings assure alignment and rigidity of the gate to reduce chatter and vibration. A heavy stainless steel hinge pin is used on all lever and weight type and lever and spring type check valves. ■ The many exclusive features of these new, heavy duty check valves are typical of the attention to detail in research, design and engineering that becomes a part of every Mueller product made for the water industry.

Write today for complete information and specifications.

MUELLER CO.
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Factories at: Decatur, Chattanooga, Los Angeles;
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ideal for use in:

PUMPING STATIONS
SEWAGE TREATMENT PLANTS
FILTRATION PLANTS
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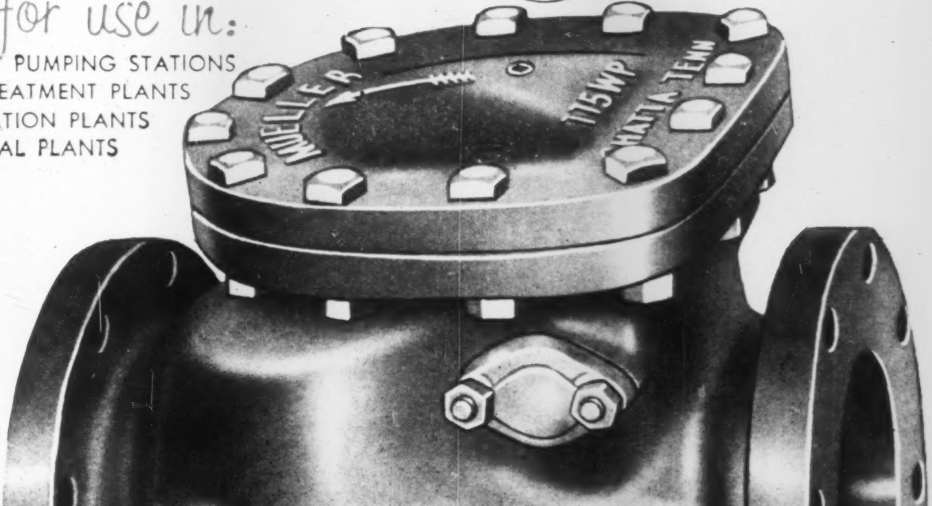
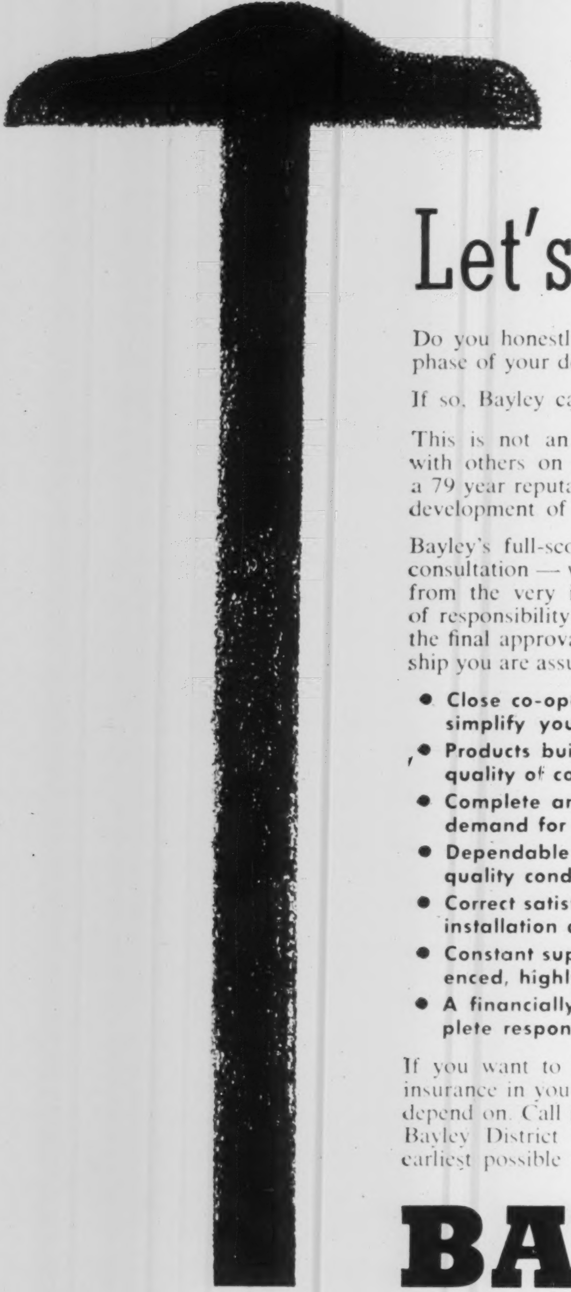
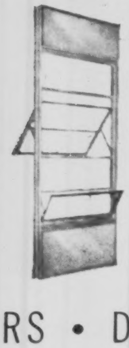


Iron Body — Bronze Mounted
Flanged, Screwed or Hub Ends
Working Pressure: 175 p.s.i.
Sizes: 4", 6" and 8"





Let's Talk Straight!

Do you honestly want quality, in its full sense? Quality in every phase of your dealings with windows or curtain-walls?

If so, Bayley can play an important role on your projects.

This is not an idle claim. It's a fact substantiated in working with others on outstanding projects throughout the nation — by a 79 year reputation for reliability and leadership in the design and development of products for the building industry.

Bayley's full-scope *quality* service starts by offering experienced consultation — with a conscientious desire to be of real help — from the very inception of your building project. With a sense of responsibility to you this policy of help continues even beyond the final approval of the finished building. And during this relationship you are assured of:

- **Close co-operation in submitting detailed drawings that will simplify your work and avoid later drawing revisions.**
- **Products built to the latest proven standards of design and quality of construction.**
- **Complete and detailed specifications that will support your demand for quality products.**
- **Dependable delivery of all materials to the job, in top quality condition.**
- **Correct satisfactory installation by Bayley's own experienced installation crews.**
- **Constant supervision of all work, as it progresses, by experienced, highly trained Bayley Engineers.**
- **A financially sound organization that can assume its complete responsibilities of fulfilling a contract.**

If you want to incorporate this type of window or curtain-wall insurance in your building project, Bayley is the company you can depend on. Call in your local Bayley representative — or write the Bayley District Office or Home Office in Springfield — in the earliest possible stages of your plans!

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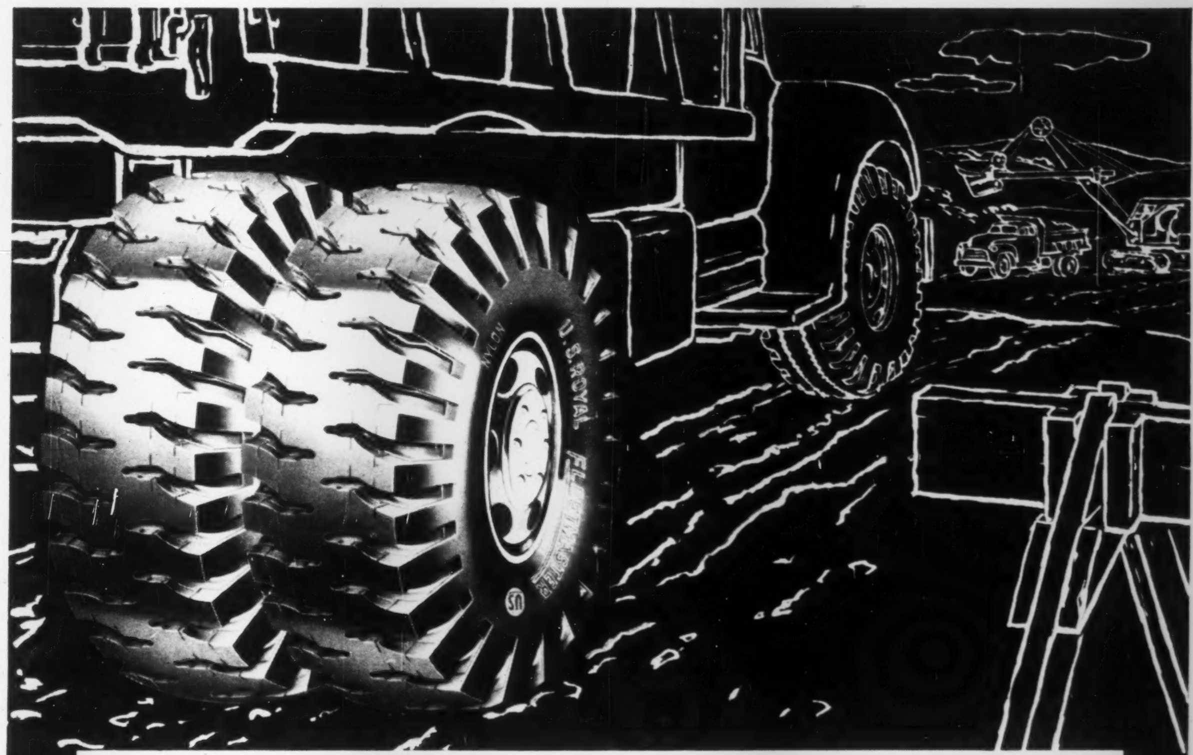
ORIGINATORS • DESIGNERS • MANUFACTURERS • INSTALLERS

NEW STRENGTH, NEW DRIVE CUT COSTLY DOWNTIME



New Cross-Lug U. S. Royal Fleetmaster Dual-Purpose-Nylon beats the tire hazards that can wreck tight schedules!

Contractors all over the country are finding out that using this great new U. S. Royal Fleetmaster Dual-Purpose reduces job delays due to tires. Its 52% stronger body, of exclusive Double-Strength Nylon cord, defies impacts that ruin ordinary tires. Its big, deep cross-lugs dig in for 35% greater traction, prevent spinning wheels, bogged-down trucks, broken schedules. See it for yourself. Call your U. S. Royal Dealer right now. And make sure to specify "U.S. Royal" on the next new equipment you buy! Available in tubed or tubeless construction.

U.S. ROYAL SAFETY 1st **TRUCK TIRES**

United States Rubber

Rockefeller Center, New York 20, New York

Pre-cut sound absorption batts of inert fiber fit into the 2¾" rib-openings of Acoustideck, under cover of 1" rigid board insulation. Standard methods are used to apply bonded roofing.

Because the acoustic perforations are in vertical webs only, the possibility of dusting is completely eliminated. Spans to 10 feet are practical with Acoustideck.

ARCHITECTS:
Durrant & Bergquist
Dubuque, Iowa
Boscobel, Wisconsin

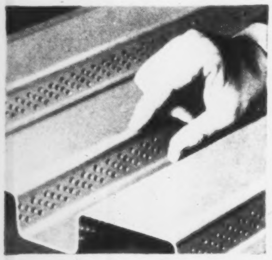
Milcor Acoustideck cuts cost on roof and ceiling for school

Acoustideck serves as *both* roof deck *and* acoustical ceiling of modern, fluted design. It goes up fast in any weather, saves on structurals, helps earn favorable insurance ratings.

Tests by Armour Research Foundation show that Acoustideck has a Noise Reduction Coefficient of .70. This satisfies the requirements of classrooms, gymnasiums, tank rooms, offices, industrial plants, and other noise-problem areas.

Acoustideck is Bonderized, then flow-coated with a prime coat of epoxy-resin enamel, oven-baked to abrasion-resistant hardness. It is available also in galvanized steel and aluminum.

See Sweet's Architectural File, section 11a/In — or write for catalog 241.



With Acoustideck, spans to 10 feet are practical. Acoustic perforations are in vertical webs only, where load-carrying ability is affected least.

MILCOR® Acoustideck

INLAND STEEL PRODUCTS COMPANY Member of the Steel Family
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ATLANTA, BALTIMORE, BUFFALO, CHICAGO, CINCINNATI, CLEVELAND, DALLAS, DENVER, DETROIT, KANSAS CITY, LOS ANGELES, MILWAUKEE, NEW ORLEANS, NEW YORK, ST. LOUIS, ST. PAUL

Brigadier General Clarence Renshaw has become Assistant Chief of Engineers for Military Construction, U.S. Army. He succeeds **Colonel E. F. Wilhoyt, Jr.**, who has been acting assistant chief since last year.

Honors

James R. Killian, Jr., Chairman of President Eisenhower's Science Advisory Committee, receives the Washington Award for 1959 from the Western Society of Engineers in Chicago.

Col. Harold K. Kelley, deputy director for construction in the Directorate of Civil Engineering of the U. S. Air Force will receive the 1958 Newman Medal. The award is presented annually by the Society of American Military Engineers in recognition of the most outstanding contribution to military engineering through achievement in design, construction, administration, research or development.

Retirements

Russell A. Hall retired as assistant city engineer of San Diego, Calif., after 13 years in that post.

Howard Sword, city engineer of Shelby, Ohio, and former superintendent of streets and sewers has resigned for health reasons. Mr. Sword was also county engineer of Richland County, Ohio.

Austin F. Shure, assistant to the chief engineer of the Maryland State Roads Commission, retired after almost 50 years continuous service with the agency.

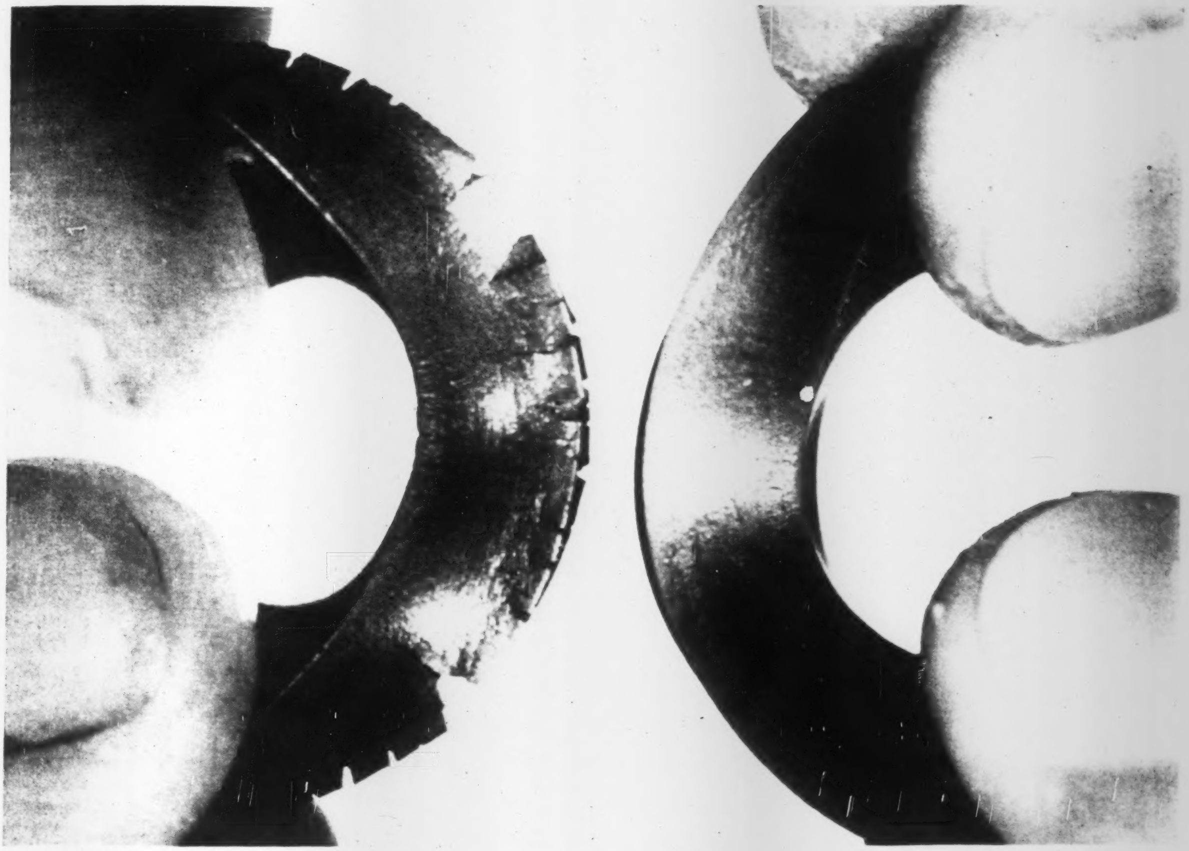
Bernard W. Booker, assistant state highway engineer in charge of District IV of the California Division of Highways, has retired after 38 years with the division.

H. R. Angwin has retired as chief of western bridge design in the San Francisco office of the Bureau of Public Roads. In his 40 years of government service he supervised the design of some 1,250 bridges for national park and national forest highways.

Ralph Green, who worked on design and cost estimates for thousands of bridges built by Chicago Bridge & Iron Co., has retired from the company. He joined the firm in 1915, shortly after receiving a B.S. degree in civil engineering from the University of Illinois.

Education

Gordon S. Brown, former head of the Department of Electrical Engineering at Massachusetts Institute of Technology, has been appointed dean of the institute's School of Engineering. He succeeds **C. Richard Soderberg**, who has been named institute professor.



Two torque converter seals, subjected to 300 hours of service at 325° F., show added protection of D-A Torque Fluid. Seal on left, used with ordinary torque fluid, is brittle and cracked, has shrunk excessively. Seal on right, used with D-A Torque Fluid, remains resilient and reveals no cracks or deterioration. It was protected by D-A's exclusive preservative.

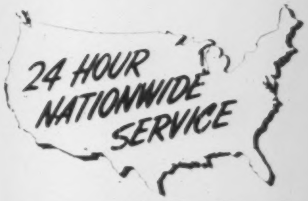
Prevent seal trouble, increase converter efficiency with D-A TORQUE FLUID

Better performance, less maintenance and longer equipment life . . . these are among the benefits you get when you specify D-A Torque Fluid for (1) heavy-duty automatic transmissions, (2) hydraulic systems and (3) rotary compressors.

Note these advantages: D-A Torque Fluid possesses superior oxidation stability, provides increased efficiency through carefully controlled viscosities and allows operation in even the coldest weather because of minus 35° F. pour point.

But that isn't all! D-A Torque Fluid is ideal for all types of rotary compressors because special high-temperature oxidation inhibitors prevent formation of sludge and varnish, extend compressor life and permit longer operation periods between lubrication changes.

And D-A Torque Fluid gives a big bonus in the protection of rubber seals . . . extends the life of seals, prevents leakage. This added protection is accomplished by a special seal preservative found only in D-A Torque Fluid. Seals last indefinitely . . . shrinkage and cracking are eliminated . . . swelling is controlled to an ideal maximum of 0.2%.

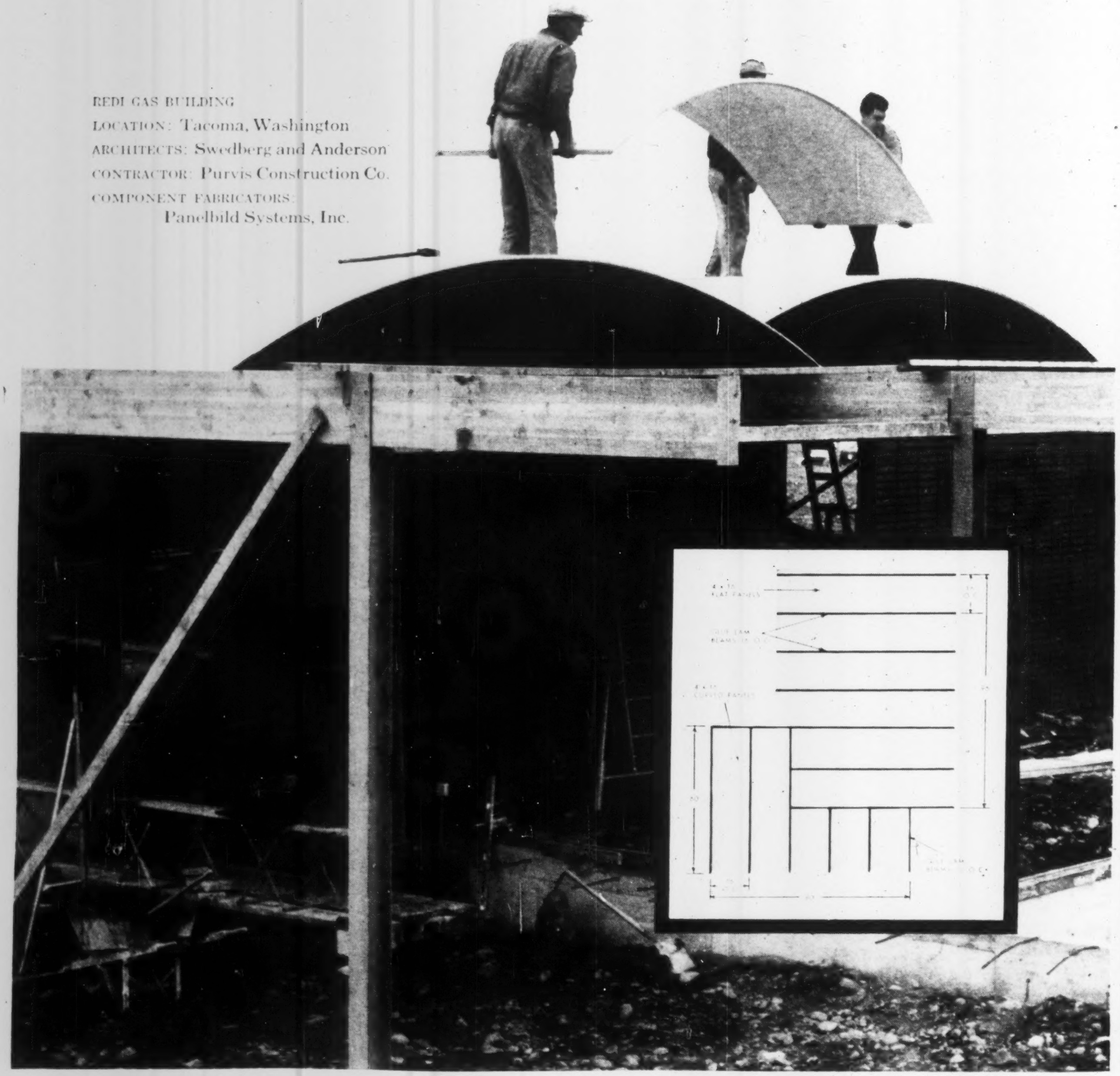


Lubricating heavy-duty equipment across the nation since 1919.

D-A LUBRICANT COMPANY, INC. • INDIANAPOLIS 23, IND.

Fir plywood roof components ...provide large clear

REDI GAS BUILDING
LOCATION: Tacoma, Washington
ARCHITECTS: Swedberg and Anderson
CONTRACTOR: Purvis Construction Co.
COMPONENT FABRICATORS:
Panelbild Systems, Inc.


4 x 16 FLAT PANELS
GLUE LAM BEAMS 16 O.C.
4 x 16 CURVED PANELS
60
GLUE LAM BEAMS 16 O.C.

reduce on-site labor by 85% floor areas at low cost

Fir plywood components helped speed and simplify roof construction on this striking office-display-warehouse building. The multiple arch roof in the front of the building is composed of curved stressed-skin panels, each 4 feet wide, spanning 16 feet; the rear of the building is roofed with 4 x 16 foot flat stressed-skin panels. Both combine roof decking insulation and finish ceiling in one easily handled component.

In addition to reducing on-site labor by about 85%, the fir plywood roof components provide superior structural values and permit large clear floor areas without supplementary support from purlins or trusses.

The in-place cost of the flat stressed-skin plywood panels came to 79c per square foot, the curved panels, $1.10 — or about 10 per cent less, locally, than comparable joist or truss construction providing the same clear floor areas with conventional decking, insulation and finish ceiling.

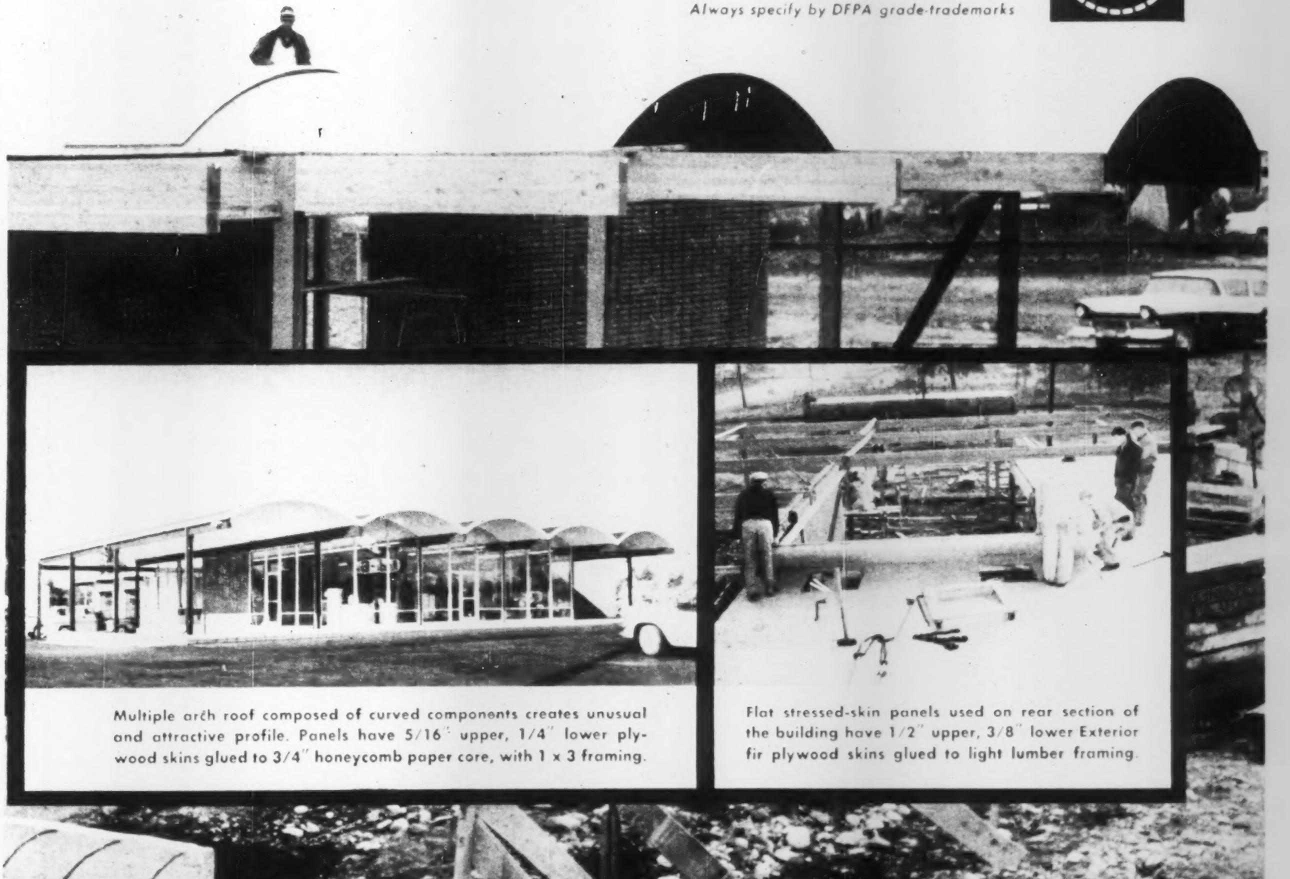
For more information about fir plywood—its uses and advantages—write (USA only):

DOUGLAS FIR PLYWOOD ASSOCIATION

TACOMA 2, WASHINGTON

—an industry-wide organization devoted to research, promotion and quality control

Always specify by DFPA grade-trademarks



Multiple arch roof composed of curved components creates unusual and attractive profile. Panels have 5/16" upper, 1/4" lower plywood skins glued to 3/4" honeycomb paper core, with 1 x 3 framing.

Flat stressed-skin panels used on rear section of the building have 1/2" upper, 3/8" lower Exterior fir plywood skins glued to light lumber framing.

Extra-Payment Consideration

Unforeseen problems or compromise of a contract dispute are legal considerations for extra payment.

Generally, an agreement to pay a party additional compensation to do something he has already contracted to do is unenforceable. However, when unexpected obstacles hinder performance of the contract, or when a compromise is reached on a dispute arising from existing agreement, additional compensation may be considered sufficient consideration for a new agreement.

Pittsburgh Testing Laboratory, which was recently involved in a federal case, contracted with Farnsworth & Chambers, Inc., to test and inspect all materials used by Farnsworth to construct concrete ramps and aircraft runways in Tulsa, Okla.

In negotiations prior to the contract, Farnsworth estimated the job would be finished in seven months—about October 15, 1952—and the testing company would finish about November 1, if it worked a ten-hour day, six-day week. The testing company's lump-sum bid of $24,450 was based on these estimates. Neither the completion date nor the number of hours to be worked per week was specified in the contract.

In September, 1952, it became evident the job would not be finished by October 1. A dispute arose over Pittsburgh's contract obligations and Farnsworth's liability for overtime pay to Pittsburgh employees working more than sixty hours a week.

Pittsburgh continued the work, under assurances from Farnsworth that it would be compensated. When no payments were made in December, 1952, Pittsburgh refused to continue without a new contract. It demanded $3,500 per month from November 1 until completion of the work, plus time and one-half for all man-hours over sixty hours per week. On December 20, Farnsworth agreed to the new terms in an oral contract.

Pittsburgh continued to perform the testing service and to submit invoices for the monthly compensation, with separate invoices for overtime.

Although Farnsworth did not pay the bills, it made no protest over receiving them. When work was completed in the spring of 1953, Farnsworth paid the balance of the retainage due under the original contract. But it repudiated the oral agreement to pay additional compensation. Pittsburgh then sued for the additional compensation.

The trial court dismissed the suit on the grounds that there was no consideration to support the agreement for additional compensation. The appellate court reversed this judgment. It held that, since there was an honest dispute over the right to additional compensation, the compromise settlement was valid and enforceable.

The appeals court ruled that, as a general rule in Oklahoma, a promise to make extra payment for the promisee to do what he is already legally bound to do is not sufficient consideration for a valid contract.

But, stated the court, under the "unforeseeable difficulties exception," courts have recognized the equity of a promise for extra payment based upon extraordinary and unforeseeable difficulties in performing the existing contract. In such cases, the courts generally sustain the consideration for a new promise, based upon standards of honesty and fair dealing and protecting against injustice or coercion, wrote the appellate court.

It said "there can be no doubt that the oral contract was made in the face of unforeseen and substantial difficulties circumstances which were not within the contemplation of the parties when the original contract was made, and which were recognized when the subsequent oral contract was entered into. The performance of the contract took more than twice as long as the parties estimated. Pittsburgh's primary cost was expensive skilled labor, and the consideration for the contract was necessarily based upon the estimated time required for performance."

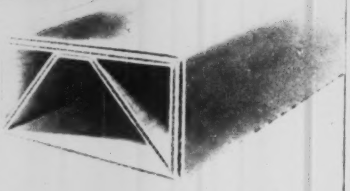
But the oral contract need not rest upon the "unforeseen difficulties" rule alone, said the court.

From another viewpoint, an agreement which compromises a bona fide dispute concerning duties and obligations under an existing contract, is supported by valid consideration and is enforceable.

(1) Pittsburgh Testing Laboratory v. Farnsworth & Chambers Co., Inc., 251 F. 2d 77, United States Court of Appeals, Tenth Circuit, Jan. 6, 1958.

(*Legal continued p. 210*)

JAY-VOIDS
America's Only Asphalt Impregnated Corrugated Forms
PREVENT CRACKED SLABS



JAY-VOIDS offer builders a more positive void than now available through conventional methods. These TESTED and PROVED forms help prevent cracked slabs by providing space underneath the slab for movement of the earth.

JAY-VOIDS lightweight, simple one-piece form folds easily for fast assembly and placement . . . are shipped and stored flat.

JAY-VOIDS are made of patented FREEZURBOARD . . . the heavy-duty asphalt and wax impregnated corrugated board . . . assures top quality and greatest strength under adverse weather conditions. (Not to be compared with ordinary corrugated board.)

JAY-VOIDS are your cheapest insurance against cracked slabs. They save you money and assure top quality concrete construction.

OUR COMPLETE LINE OF CONSTRUCTION FORMS INCLUDES:
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- Rib Slabs
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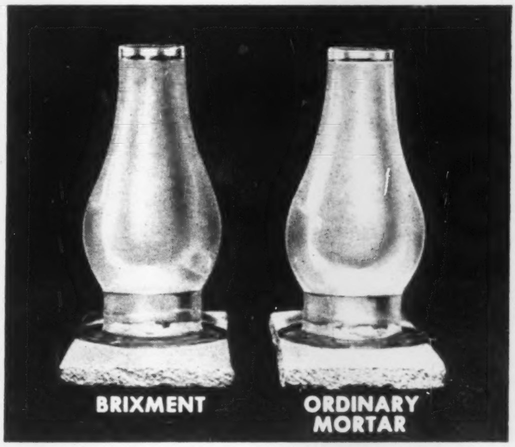
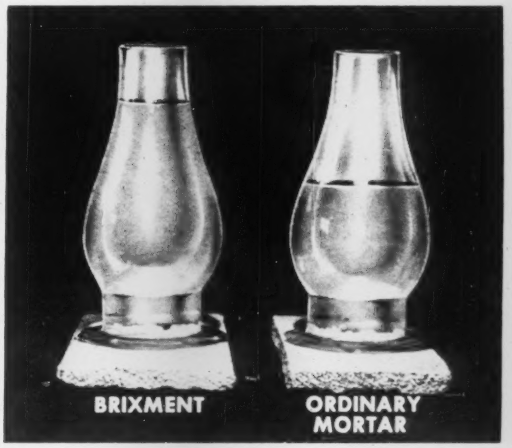
Is Waterproofed— More Impermeable



Prepare two slabs of mortar, one with Brixment and one with ordinary cement-and-lime mortar. After mortars have hardened, seal a lamp chimney to each of the mortar slabs, and fill with water.



After 24 hours, note how much water has gone into and through the ordinary cement-and-lime mortar, and how little water has gone into or through the Brixment mortar.

High impermeability is desirable in mortar because: (1) It helps prevent the mortar from becoming saturated, thereby helps protect it from damage caused by freezing and thawing. (2) It helps prevent efflorescence by checking the passage of water and keeping it from percolating down through the wall. (3) It helps prevent the absorption of moisture up from the foundation and into the wall.

Brixment is highly impermeable. It contains an effective air-entraining, water-repelling agent. Even under pressure, water will not readily penetrate Brixment mortar.

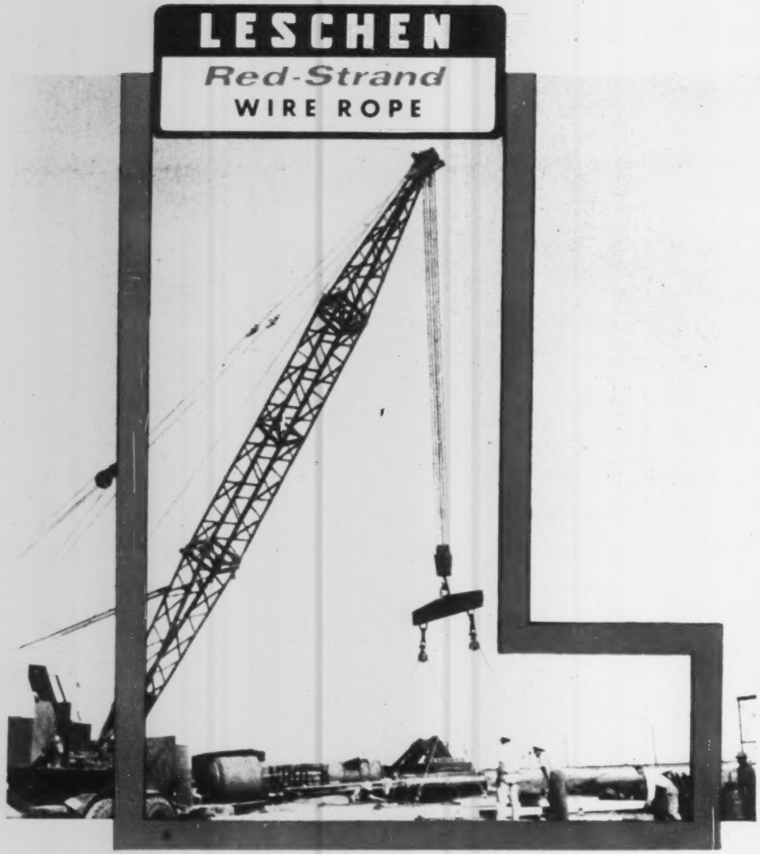
Brixment easily meets the special requirements of the Federal Specifications for water-repelling masonry cements.

High impermeability is only one of many advantages which have helped make Brixment the most widely-used masonry cement on the market. It will be worth your while to hear *all* the advantages of Brixment, the next time a Brixment salesman calls on you. Or write direct for full details.

LOUISVILLE CEMENT COMPANY, LOUISVILLE 2, KENTUCKY

Cement Manufacturers Since 1830

when the going gets rough–
give 'em "L"



When the load is on the crane, you'll be glad you rigged with *Leschen*—the wire rope that's the same top quality in every foot of every reel. The new Leschen wire mill is designed to deliver exactly that. New machines . . . new processes . . . exclusive new continuous-flow technique—all as modern as tomorrow. Try Leschen Red-Strand Wire Rope now and see how its uniform quality makes your operation safer, your replacement time farther in the future. Make your next order Leschen! *Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis 12, Mo.*

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Indemnity Clause

Settlement of claim by owner does not bar a suit against contractor

A contract clause making the contractor rather than the owner liable for personal injuries occurring on a job can be very broad. If an accident is covered by the clause, the owner may be able to collect from the contractor even after the owner has entered into a private settlement of the claim.

In a New Jersey case, for example, the owner of a building that was being converted into a garage brought an action on an indemnification agreement for losses it sustained because of an accident to an employee of the contractor.

The contract contained the following indemnification agreement: "Responsibility for Accidents. The contractor shall bear all loss or damage from accidents which may occur to any person or persons, by or on account of the prosecution of the work, until possession is taken by the owner. The contractor must provide all legal and necessary guards, railings, lights, warning signs, etc., during the progress of the work."

The contract also provided that: "The contractor shall carefully examine the premises before submitting his bid. No allowance will be made him for lack of knowledge of all conditions, except such underground conditions as are indeterminable before the beginning of the work. The submission of a proposal will be construed as evidence that such a visit and investigation has been made and later claims for labor, equipment or materials required or difficulties encountered will not be considered."

During the work, an employee of the contractor was injured when part of a ceiling fell on him. The owner claimed that the injury resulted from the stripping of a partition wall of plaster by heavy blows of a crowbar or hammer administered by the employee. Because the stripping of the plaster was part of the work to be performed under the contract, the owner contended the contractor was liable for the injury sustained by its employee. When the employee instituted an action against the owner, the owner requested the contractor to take over the defense of the action. The contractor refused.

The employee's action was dismissed by the trial court, but this judgment was reversed on appeal, the appellate court holding that sufficient evidence

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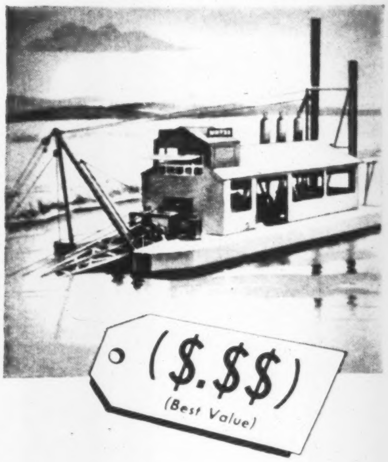

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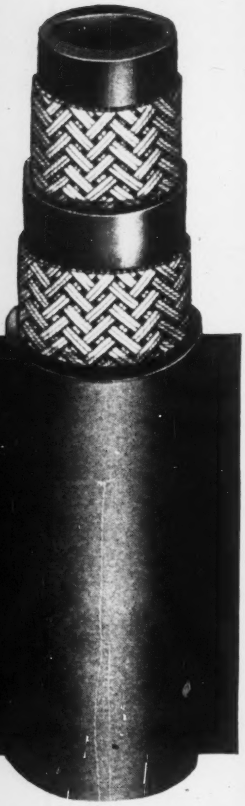

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VERSICON hose is good for compressed air—especially for use with air-operated drills and pumps—for steam, water, oil, grease, gasoline, welding gases, and many dilute acids. Truly versatile!

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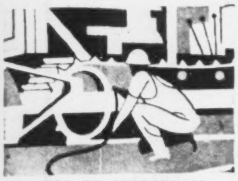

FOR OIL AND GREASE

FOR WATER AND STEAM

had been produced at the trial from which the jury might have found that the injured employee was an invitee on the premises and was injured by reason of a defect in the ceiling of which the owner had notice, constructive or actual. Thereafter, the owner's insurance carrier settled the claim for $33,000. No notice of this settlement was given to the contractor in advance of the negotiations or the execution of the settlement.

An action was then brought against the contractor to recover the amount paid the injured employee. The trial court dismissed the action on the ground that the voluntary settlement of the suit prevented the possibility of a judicial determination of whether the accident resulted from negligence on the part of the owner. This judgment was reversed on appeal¹; the appellate court holding that under the contract indemnification clause, the owner's right to indemnification was not automatically defeated by their settlement of the claim, if such action was taken in good faith, and reasonable under all the circumstances of the case, including the risk of going to a decision in the hands of the jury. The indemnity clause of the contract was broad enough to cover the accident, the court said.

(1) Stern v. Larocca, 140 A. 2d 403, Superior Court of New Jersey, Appellate Division, April 11, 1958.

Government Delays

Prime contractor escapes liability to the sub

A subcontractor on a government contract cannot hold the prime contractor responsible for delays caused by government agents—at least when the sub has notice of the possibility of delays.

That was the ruling of a federal court in Florida on a conflict that arose during construction of the Jim Woodruff Dam near Chattahoochee. Work on one phase of the project had been held up for some time because of a dispute with the government over the type of equipment to be used. The sub involved tried to recover from the prime contractor the expenses to which he had been put by the delay. The facts were these:

B. Perini & Sons and Associates received in 1949 an $8.7-million contract from the U.S. government to build a lock and spillway at the dam.

Perini subcontracted item 55 to J. A. Postell for $58,580. This choice of subcontractor created an immediate conflict between Perini and the Corps of

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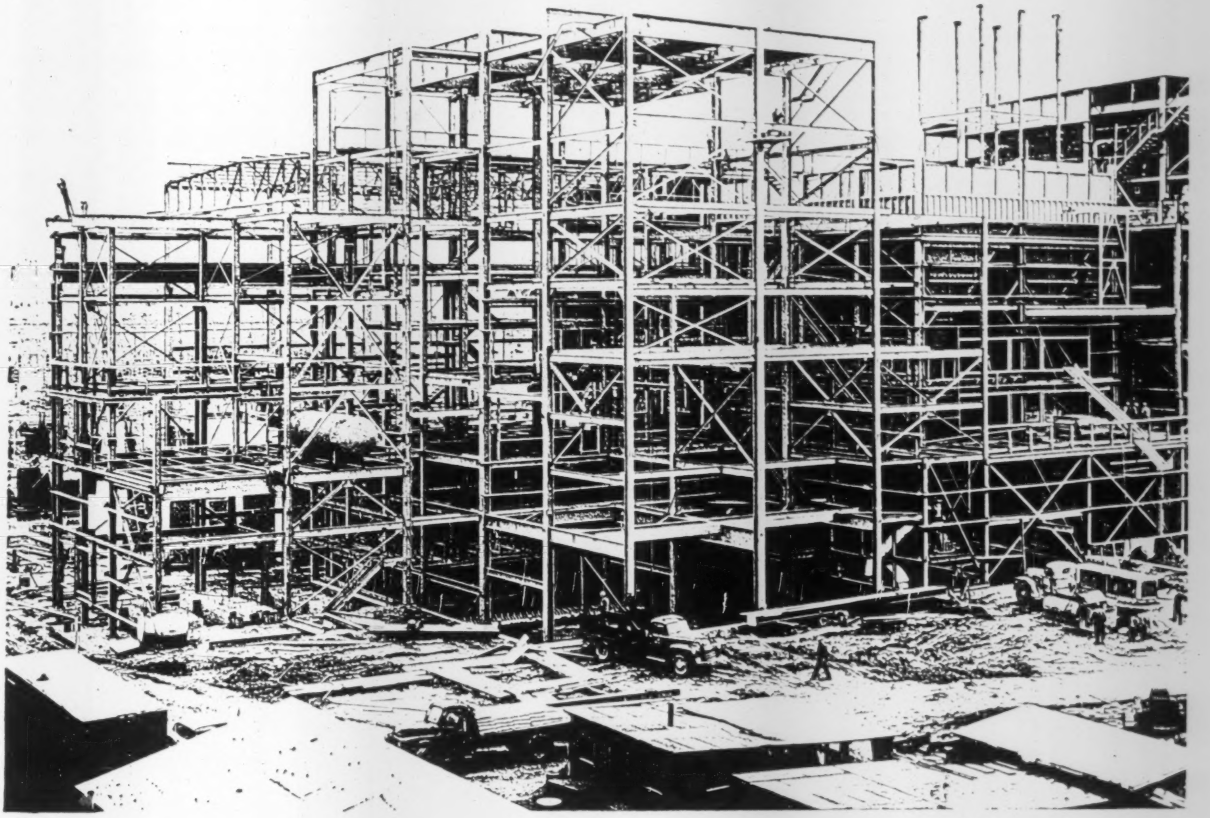
in fabrication and erection of Structural Steel



McMeekin Station, Unit Number Two

new South Carolina Electric and Gas Company expansion

South Carolina's electric power capacity grows as Unit Two of McMeekin Station at Irmo, South Carolina is completed.

For this new South Carolina Electric and Gas Company Plant expansion, more than 1200 tons of fabricated steel and platework were supplied by The Ingalls Iron Works Company, and erected by The Ingalls Steel Construction Company.

Here is another example of INGALLS skill in fabrication and erection of structural steel for power houses. South Carolina Electric and Gas Company is one of the 46 leading power companies in this country who have used INGALLS facilities for fabrication and or erection of structural steel for their power plants.

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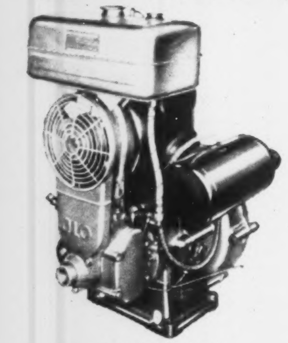
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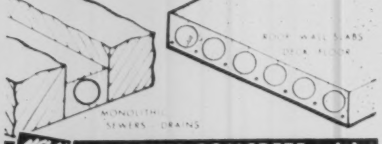

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CIRCLE I-8 READER SERVICE CARD

Engineers, because Postell planned to use a different make of hydraulic equipment for operation of the lock gates than the Corps of Engineers wanted.

The Corps wanted to use a new type of hydraulic equipment. After investigating various makes of equipment, it decided on equipment manufactured by the Vickers Co., of Detroit.

Subsequently, the Vickers Co. helped the Corps of Engineers prepare plans and specifications for item 55. The Corps included in the contract and specifications a provision that Vickers Co. or "similar and equal" equipment should be used in the hydraulic system. The Corps went a step further and specified that each power unit should "be factory assembled by the pump manufacturer and tested at his plant."

"The Corps of Engineers," the court noted, "was fully aware it had no authority to specify the equipment of any particular manufacturer. The use of the above-mentioned specification was meant, in effect, as a warning that the Corps expected Vickers equipment to be used, since no other U. S. manufacturer was able to assemble and test the equipment at its plant."

The specifications also required the subcontractor to have shop plans approved by the Corps of Engineers. The chief engineer on the project refused to approve Postell's plans, stating that he would only approve equipment made by the Vickers Co.

With the help of some members of Congress, Postell finally got assurance from the chief engineer that he would consider shop drawings for equipment not made by Vickers. It was not until October 23, 1951 that approval was given to some of the equipment to be used. Final approval of all parts of the equipment was not given until April 7, 1952.

The subcontractor sued the prime contractor for some alleged items of extra work and for the expense he incurred in getting approval of non-Vickers equipment. The court rejected Postell's claim.

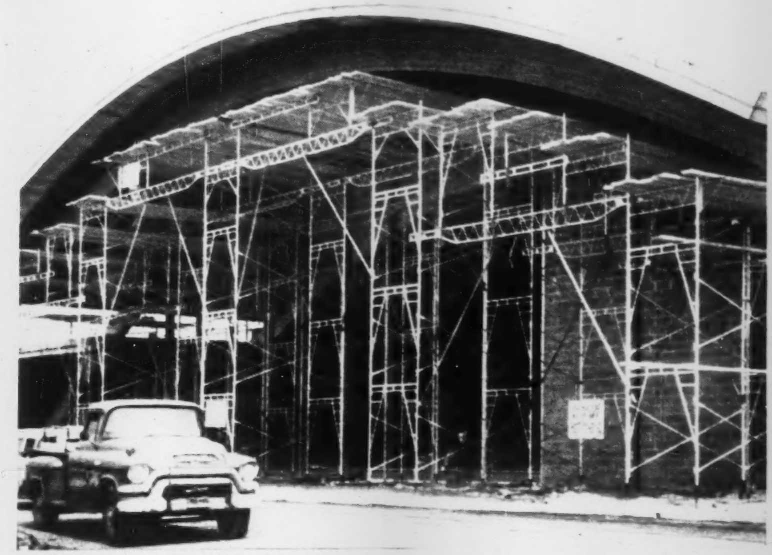
It ruled that Postell knew he was going to have a great amount of trouble in getting the Corps of Engineers to approve his supplier. He won the Corps' approval, but the court said, "he is certainly not entitled to recover from Perini the additional costs he incurred in winning his point and getting his equipment accepted. This victory will have to suffice as payment for his additional expense."

(1) United States v. B. Perini & Sons, 159 F. Supp. 911, United States District Court, N.D. Florida, March 20, 1958.

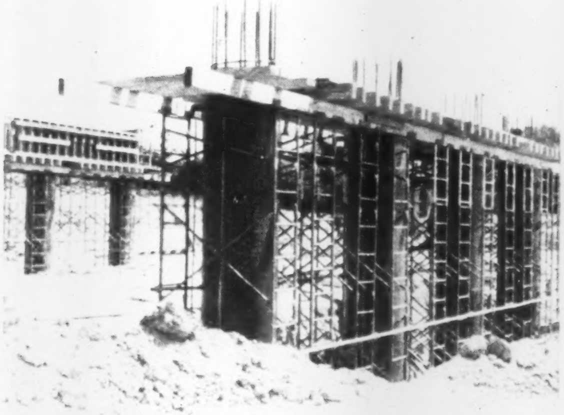
(Legal continued p. 216)

Scaffolding Methods . . . by Patent Scaffolding Co.

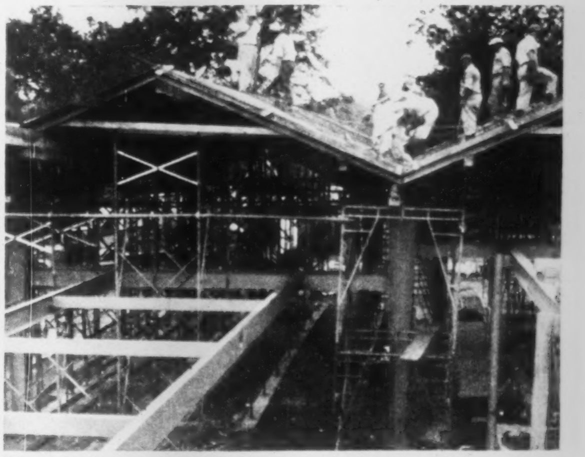
STEEPLE WORK PLATFORMS—Workmen for J. P. Roberts & Sons, contractor, guide into place a new steeple on this church. Wide, stable platforms made of "TubeLox"® Steel Scaffolding are built up rapidly.



PERFECT ACCESS FOR PLASTERERS—To give plasterers the right working heights at the underside of the curved, cantilevered roof of the Penn Fruit Building, Bergen Mall, Paramus, New Jersey, the contractor, Acme Plastering Company, uses "Trouble Saver"® Sectional Steel Scaffolding. First, frames are erected in towers. Then, they are joined by trusses which lock the units together and also make wide platform areas.



HEAVY PIER SUPPORT—On the North-South Ohio Turnpike, joint venturers, Kiewit-Condon-Cunningham, provide support for the formwork for these bridge piers by using "Trouble Saver" Shoring made from 2'-wide ladder frames erected to 26'-high towers spaced 5' apart. Built-in ladders provide easy access for forming work. 20" adjustable legs permit exact height adjustment.



SHORING A FOLDED PLATE ROOF—To make sure that the angle joints of this folded plate roof system do not move when the concrete, 4" to 6" thick, is poured; the contractor, Brick and Concrete Construction Co., uses "Trouble Saver" Sectional Steel Shoring placed to support the impact load on each adjoining folded plate section. New Charter Road School, Acton, Mass.

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It's ruggedly built, yet compact and light enough to be completely portable. Mount it on skid base, truck or trailer and power it with gasoline, diesel, electric or air motor. It's easy to use — inexpensive to operate!

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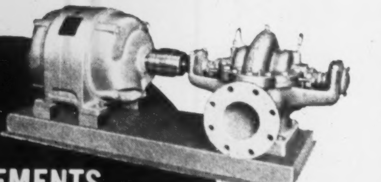

ROTARY ELEMENTS perfectly balanced statically and dynamically...

assuring vibrationless operation. Deming Split-Case Centrifugal Pumps are available in a wide range of sizes from 2" to 14".

Just one of the many Deming pump features that provide longer life and lower operating costs

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Retainage Payable While Extra-Work Claims Pend

A contractor may sue to recover the retained percentage admittedly owed him, without awaiting settlement of claims for payment on extra work. He is also entitled to receive interest on money admittedly owed him, but held pending settlement of the dispute.

A subcontractor won his suit in a federal district court against a prime contractor to recover for alleged extra work. But the appellate court reversed this decision, ruling that the subcontractor had contracted to perform the alleged extra work and was not entitled to extra compensation. The subcontractor, however, did receive judgment for a percentage of the contract price that was retained.

In a letter, the general contractor had admitted owing the subcontractor a retained percentage of the contract price, but refused to pay it unless the sub executed a general release. The subcontractor refused to sign a release and sought recovery of the retainage in his suit for extra-work payment.

The appellate court awarded the subcontractor the amount of retainage, plus interest on it from the date of the general contractor's letter in which he admitted his debt.

Construction contracts often provide that the acceptance of final payment constitutes a release of all claims. This sometimes puts the contractor in an awkward position. He may have large claims pending and yet, at the same time, have dire need of the retained percentage to meet his bills.

The courts, recognizing the unfairness of this, have recommended the practice of starting two simultaneous suits one to recover the retainage admittedly owed, with interest, and the other for the disputed claim for extra work.

Upon application, the court will then grant the amount admittedly owed, with interest.

Blake Construction Co. v. United States, 252 F. 2d 658, U.S. Court of Appeals, Fifth Circuit, Feb. 25, 1958.

These summaries of court decisions are prepared by J. Vernon Werbin, Esq., New York attorney and licensed professional engineer, who is author of the following books published by McGraw-Hill Book Company, Inc.: *Legal Phases of Construction Contracts; Legal Guide for Contractors, Architects and Engineers;* and *Legal Cases for Contractors, Architects and Engineers.*

CIRCLE X-9 READER SERVICE CARD

How I built a $75,000 EXCAVATING BUSINESS in just 14 months

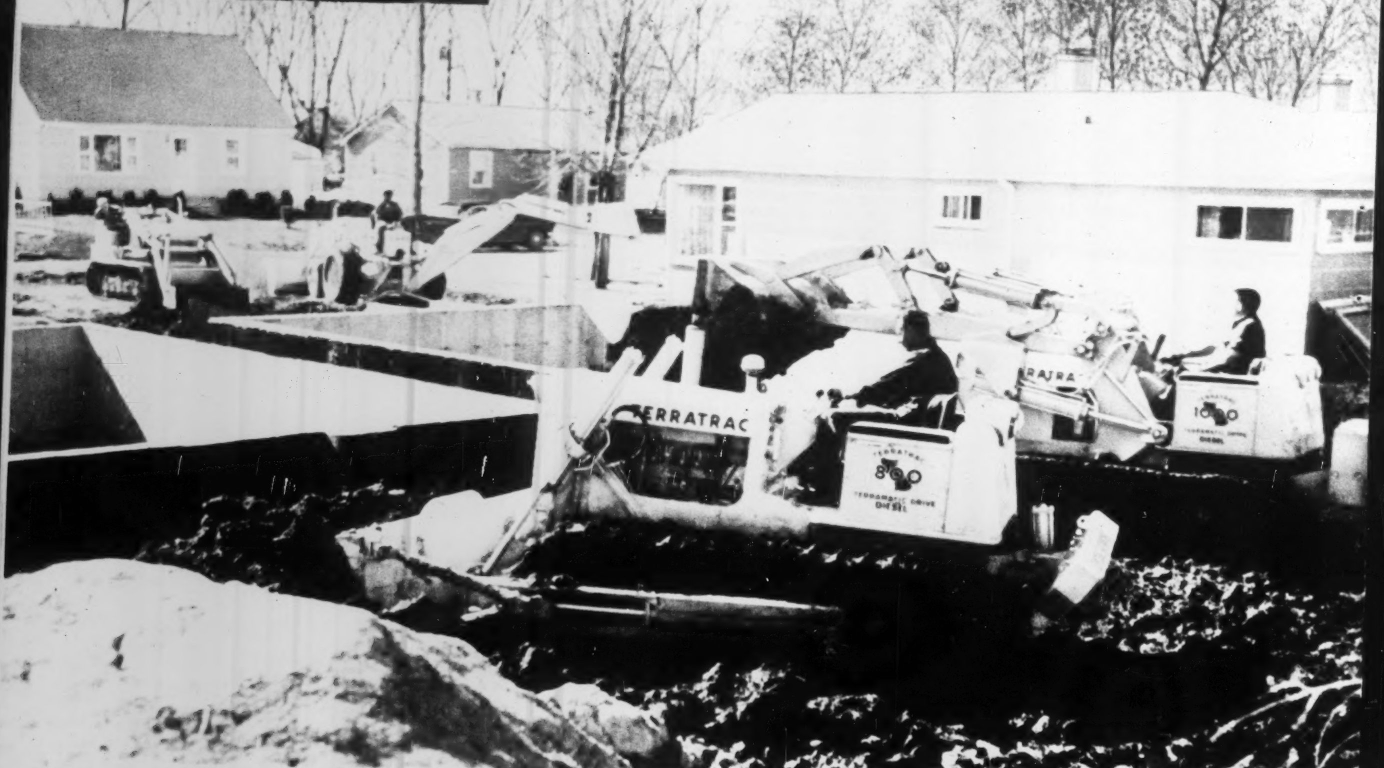
with TERRAMATIC® DRIVE

CERTIFIED
OWNER
REPORT

LEVICKAS EXCAVATING CO., OAK LAWN, ILLINOIS

“Our books prove we we bought Case

Ted Levickas and his wife, Doris, have good reason to look pleased as they study the rapid growth of Ted's excavating business, in the quiet confines of their efficient "home office". Ted and his father, Peter, also expect to build 20 new homes this year — 10 on contract and 10 on speculation.



"Assembly-line" operations like this save money for Levickas' customers. In foreground, high-speed Case 800 power-angling dozer and 1000 tractor-shovel backfill a row of new foundations. In background, Case 420 wheel backhoe-loader digs a utility trench, while "420" crawler-loader handles clean-up.

Levickas claims his Case Terramatic Drive dozer can carve out basements in a fraction of the time required by conventional rigs. By pushing dirt outward to form ramps at both ends of hole, this 5' deep excavation for a 26' x 46' poured basement was completed in just 3½ hours, including holding to within 2" of final grade.

made the right decision when TERRAMATIC DRIVE Crawlers”

Ted Levickas, Oak Lawn, Ill., is fast becoming known as one of the busiest and best excavating contractors in the Chicagoland area. Key to his remarkable success is his Case Terramatic Drive crawler tractors, which actually put him in the excavating business.

Ted started his business career 12 years ago as a residential contractor. Working with his dad in the Father & Son Construction Co., he finally became *"fed up with paying through the nose"* for excavating and grading service on homesites. "I figured we could *save money, and increase efficiency by owning our own equipment,"* he explains. With the assurance of additional excavating work from several builder-friends, Ted decided to give it a whirl.

Started Excavating as "Sideline"

After experimenting with various types of equipment, he finally purchased a 1½-cu. yd. Case Model 800 tractor-shovel. "Terramatic Drive sold me," Ted explains. (This exclusive combination of torque converter and 4-speed constant-mesh transmission actually "senses" changing loads . . . increases push-pull power instantly, automatically . . . with no clutching, shifting or stalling. Simple hydraulic controls provide on-the-go power-shifting, plus an independent forward-reverse drive on each track for increased speed and maneuverability.) "In just a few days I was outproducing conventional loaders two-to-one," Ted stated.

Business Starts Booming

As word of Levickas' new excavating service got around, orders began to pour in from other builders. Last September he traded his original "800" for a bigger, more powerful Case Model 1000 tractor-shovel, and a Model 800 power-angling dozer. He also organized a separate company — *Levickas Excavating Co.* — to specialize in excavating and grading work. This spring, he added *two more Case units* — a ⅝-cu. yd. Model 420 crawler-loader and a Model 420 wheel-mounted backhoe-loader, for small-yardage excavating and clean-up jobs.

Better Service—Builds $75,000 Business

"Being a builder myself, I appreciate the importance of prompt service, and a clean, accurate job that requires a minimum of hand finishing," Ted adds. "Now with the extra speed and precision control of Case Terramatic Drive, I can give my customers more of both. For example, when I hired work done, it took a subcontractor with a *conventional* gear-shift tractor a full 8-hour day to dig ONE 28' x 40' basement. Now, *one of my Case machines can dig THREE basements that size in just 10 hours.* This means I can pass on a substantial saving to my customers, and still make a reasonable profit myself." And apparently Ted knows whereof he speaks because, in just 14 months, his excavating "sideline" has blossomed into a healthy $75,000-a-year business — and it's *still growing!*

Geared for fast service — Ted Levickas hands work orders to his operators. (L to R — John Wilson, Joe Koncius, Ed Vacala and George Paser.) Equipment includes 4 Case rigs, two dump trucks and two tilt trailers. Ted plans to add two more Case crawlers soon.

Operator George Paser finds the combination of Terramatic Drive and exclusive Case power-angling blade save time and temper, grading around columns and close to walls on this shopping center job. A carpenter for 14 years, Paser became an expert with Terramatic Drive in one week.

Ted operates the Case 1000 tractor shovel up to 12 hours a day himself and still has plenty of energy for supervising his building business. The secret, according to Ted, is Terramatic Drive which eliminates all clutching and shifting with effortless hydraulic controls.

"I'd recommend Case Terramatic Drive to anybody"

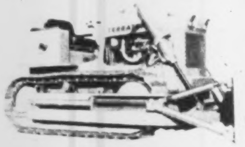
Theodor M. Levickas

After building a $75,000 excavating business in just 14 months, it is perhaps only natural for Ted Levickas to give such an unqualified endorsement to Case® Terramatic® Drive crawlers. Says Ted, "They will whip any machines in their class I've ever seen — and to prove we *mean* what we say, we plan to buy two more Case units in the near future. Service from our Case Dealer has been excellent."

Ted Levickas (right foreground) takes time out to look over a brand new Case 1000 Tilt-Crown Dozer, which the Case Dealer, Nord's Tractor and Equipment Service, Villa Park, Ill., has brought out to demonstrate. Explaining the unique blade, which tilts hydraulically from the operator's seat, are John Slivka (left) vice pres., and Bob Kaphen, salesman for Nord's.

CHECK THE COMPLETE CASE INDUSTRIAL LINE

1000 100 HP* Diesel with exclusive Terramatic Drive, torsion bar suspension, automatic track lubrication.

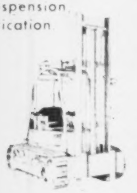


800 80 HP* Diesel with exclusive Terramatic Drive, torsion bar track suspension, automatic track lubrication.

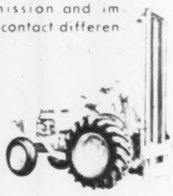
600 62 HP* Diesel or Gas, with torque converter, 4-speed hydraulic power-shift transmission and power-steering.

520 50 HP* Gas, or 45 HP* Diesel with torque converter, 3-speed gear transmission and improved total-contact differential steering.

420 42 HP* Gas with ferrometallic clutch, 3-speed gear transmission and improved total contact differential steering.



M-3B 3500-lb. capacity fork lift. 9', 14'3" or 21'4" mast. 50 HP* Gas engine with torque converter, 3-speed gear transmission and improved total-contact differential steering.



M-420 4000-lb. capacity fork lift. 9½', 14'3" or 21'6" mast. 47 HP* Gas engine with torque converter, 8-speed shuttle transmission and power-steering.

W-9 Terraload'r 6000-lb capacity, 4-wheel drive, rear wheel power steer. 1¼, 1¾ or 2¾ cu. yd. bucket. Gas or Diesel engine with torque converter, power shift, power transfer differential.

W-5 Terraload'r 3000-lb. capacity, front-wheel drive, rear-wheel power steer. 1-cu. yd. bucket. Gas engine with torque converter, shuttle shift.

420 47 HP* Gas with torque converter, 8-speed shuttle transmission, power-steering.

*Gross engine flywheel H.P. sea level (corrected) max. H.P. based on 60° F. and 29.92" Hg. ... rating. Nebraska test not yet available.

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- ☐ Model 520 crawler with ....
- ☐ Model 420 crawler with ....
- ☐ M-3B Fork Lift
- ☐ 420 Wheel Backhoe-Loader
- ☐ M-420 Fork Lift
- ☐ W-5 Terraload'r
- ☐ W-9 Terraload'r

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Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, MARIE MORAVSIK, ELAINE CHOMYAK, ELIZABETH WERRA, ELEANOR QUERET, Reports, J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

R. I., West Warwick—CHURCH—BA 6-23—St. James R. C. Church, Chancery Office, 34 Fenner St., Providence church, Arctic Square. $400,000. Michael Traficante, 175 Taunton Ave., East Providence, archt. CD 2-9.

▲ Conn., Manchester—SCHOOL—BA 6-30—Town Municipal Bldg., 41 Center St., Town Hall. North Junior High School, off east Middle Tpk. $1,000,000. Plans deposit $75. Ebbets, Frid & Prentice, 862 Asylum Ave., Hartford, archts. A. John Macchi, 44 Gillett St., Hartford, engr. CD 4-22.

▲ Conn., Norwalk—INSTITUTE—BA 7-1—State P. Wks. Comr., 165 Capitol Ave., Hartford. State Technical Institute, Richards Ave., Proj. BI-R-175. $2,840,000. Plans deposit $55. Lyons & Mather, 211 State St., Bridgeport, archts. CD 3-19.

BUILDINGS—SLC

▲ Mass., Cambridge—APARTMENT—Continental Terrace Corp., 111 29 Garden St., soon lets contract 7 story apartment house. $1,500,000. Hugh Stubbins & Assoc., 806 Mass. Ave., archts. Goldberg, LeMessurier & Assoc., 669 Boylston St., Boston, structural engrs.

HEAVY CONSTRUCTION—LB & CA

▲ City Boston, Real Property Bd., City Hall Annex, Boston, Mass., returned unopened bids to have been opened June 4, erecting and leasing off-street parking garage, Central and Kilby Sts., BOSTON, MASS. $1,500,000. M. A. Dyer Co., 24 School St., Boston, Mass., archts. Will rebid with two elevators added. CD 5-6.

▲ M. DeMatteo Constr. Co., 200 Hancock St., Quincy, Mass., LB $890,000, est. $1,563,260, base bid, extension Runway 8-26 and Taxiway, U. S. Naval Air Station, South Weymouth. NBy-23011. Spec. No. 230115-9. WEYMOUTH, MASS. Dist. P. Wks. Office, 1ND, 495 Summer St., Boston 10, Mass. Bids June 4. CD 5-6.

▲ RHODE ISLAND—State R. I. & Prov. Plants, Div. Purchase, State House. Bids opened 6-3.

R. I.—M. A. Gammino Constr. Co., 228 Valley St., Providence, R. I., LB $2,173,143, est. $2,200,000, grading, drainage, North Smithfield Expressway to Mass. Line. Bid 894. R. I. Contr. 5903. F. A. Proj. F-035 (10), North Smithfield.

R. I.—John Ambrose, 1104 Pontiac Ave., Cranston, Mass., LB $180,887, est. $200,000, hwy. work from Wright Ave. to Wampanoag Trail. Bid 892. RI Contr. 5914. FA Proj. S-0290 (1), East Providence. CD 5-25.

BUILDINGS—LB & CA

† Consolidated Constructors, Inc., 807 Congress St., Portland, Me., CA $696,051. Proj. ME-59-C-FED-2-A9. ELEMENTARY SCHOOL at Capehart Housing, 7th St., Dow Air Force Base, BANGOR, ME. U. S. Housing & Home Finance Agency, 346 Broadway, New York, N. Y. Bids May 14. CD 5-20, under LB.

Consolidated Constructors, Inc., 807 Congress St., Portland, Me., LB $508,622, est. $550,000. Base Bid. HOSPITAL addn., alterations, Winthrop St., BATH, Me. Bath Memorial Hospital, 23 Winthrop St., Bath, Me. Bids June 2. CD 6-10.

C. Profenno Co., 127 Marginal Way, Portland, Me., LB $504,300, est. $500,000. Proj. ME-60-C-201-A. JUNIOR HIGH SCHOOL, opposite new Elementary School, BRUNSWICK, ME. City Supt. Schools, Main St., Brunswick, Me. Bids June 3. CD 5-29.

C. Profenno Co., 127 Marginal Way, Portland, Me., LB $588,700, est. $772,000, MEN'S DORMITORY, State Teachers College, FARMINGTON, ME. State Dpt. Educ., State House, Augusta, Me. Bids June 3. CD 5-19.

Brown Constr. Co., Inc., 22 Monument Square, Portland, Me., CA $520,000, remodel EXPOSITION BLDG., Park Ave., PORTLAND, ME. City, City Hall, Portland, Me. Bids May 27. CD 6-3, under LB.

▲ Granger Contg. Co., Inc., 306 Main St., Worcester, Mass., LB $1,497,500, Oakmont REGIONAL SENIOR-JUNIOR HIGH SCHOOL, Maple Ave., South Ashburnham, ASHBURNHAM and WESTMINSTER, MASS. Towns Ashburnham-Westminster Regional School Dist., c/o James A. Britton, archt., 315 Federal St., Greenfield, Mass. Bids June 5. CD 5-12.

▲ Ralph Richard Constr. Co., 495 Whiting Ave., Dedham, Mass., CA $1,772,000, low-rent HOUSING, PHA Mass. 8-1, CHICOPEE, MASS. City Housing Auth., Narragansett St., Chicopee, Mass. Bids May 12. CD 5-15, under LB.

▲ Canter Constr. Co., 185 Corey Rd., Brookline, Mass., LB Approx. $1,000,000, HOSPITAL, ROXBURY, MASS. Jewish Memorial Hospital, 59 Townsend St., Roxbury, Mass. Bids June 3. CD 5-13.

J. G. Roy & Sons Co., 21 Silver St., Springfield, Mass., LB $405,000, est. $400,000, STUDENT HEALTH CENTER and INFIRMARY, SOUTH HADLEY, MASS. Mount Holyoke College, Bus. Mgr., South Hadley, Mass. Bids June 2. CD 5-19.

▲ Franchi Constr. Co., Inc., 216 Webster St., Newton, Mass., CA $1,058,997, HIGH SCHOOL, [illegible] St., WATERTOWN, MASS. Town Supt. Schools, 30 Common St., Watertown, Mass. Bids May 27. CD 6-2, under LB.

Frank Procaccino, Jr., 145 Kent St., Hartford, Conn., CA $659,875, colonial design MEDICAL CENTER, Cottage Grove Rd., "Bloomfield Village," BLOOMFIELD, CONN. Sidney Neiditch, 1 Linbrook Rd., West Hartford, Conn. Bids Apr. 23, awarded June 4. CD 5-6, under LB.

▲ Litchfield County Homes, Inc., 157 Migeon Ave., Torrington, Conn., Owner Builds, $4,000,000, 400 ranch-style HOUSES, Packer Rd., Cow Hill Rd., Bindloss Rd., 150 acre tract, GROTON, CONN.

Harvan Estates, Ponus Ave., Norwalk, Conn., Owner Builds, $560,000, 56 HOUSES, "Harvan Estates," Ponus Ave., NORWALK, CONN.

F. W. Brown Co., Yantic Flats, Yantic, Conn., LB $488,529 (6 bidders), OFFICE for State Highway & Motor Vehicle Dpts., East Great Plains access to Connecticut Tpk., Proj. CP-S-60, NORWICH, CONN. State P. Wks. Comr., 165 Capitol Ave., Hartford, Conn. Bids June 3. CD 5-21.

▲ Beechwood Development Co., Willard Ave., Newington, Conn., Owner Builds, $1,400,000, 140 HOUSES, Willard Ave., NEWINGTON, CONN.

P. Francini & Co., Inc., Water St., Derby, Conn., LB $676,800 (11 bidders), 1 story ELEMENTARY SCHOOL, Beecher Rd., WOODBRIDGE, CONN. Town School Bldg. Comm., Center School, Center Rd., Woodbridge, Conn. Bids June 2. CD 5-26.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

† Maryland, Virginia and District of Columbia—BA 7-16—Bureau P. Rds., Dpt. Commerce, 1440 Columbia Pike, Arlington, Va.

Contr. 3B, upper portions of bascule piers, Woodrow Wilson Memorial Bridge over Potomac River. CD 12-8-52, under D. C., Wash.

BUILDINGS—BA

† D. C., Wash.—LABORATORIES—BA 6-2?—Area P. Wks. Office, Chesapeake, U. S. Naval Gun Factory, consolidation of Engineering Laboratories, Bldgs. 220 and 219, Naval Gun Factory. $250,000-$500,000.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000, other public works $88,000, industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED
New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: **Before and including appointment of engineers or architects.**

BIDS ASKED: BA **(new announcements only). For full calendar, see also preceding issues.**

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB **On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.**

CONTRACTS AWARDED: CA **Except awards to low bidders previously reported in low bidder stage.**

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS **are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.**

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

HEAVY CONSTRUCTION—LB & CA

▲ Sociata Anonima Electtrificazione, Milan, Italy, LB $1,371,451 (1 bidder), 225 mi. Niagara-Adirondack Transmission Line, Niagara Project to connect with St. Lawrence Project, Niagara Co. to Monroe Co. Contr. No. ALP-100, NEW YORK. Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. Bids June 2. CD 5-25.

▲ NEW YORK—State Dpt. P. Wks., State Office Bldg., Albany.

N. Y.—Hogeboom & Campfield, Inc., Seneca Turnpike, New Hartford, N. Y., CA $1,392,159, bit. conc., 9.44 mi. and widen existing bridge 28 ft. span I-beam, Boonville Town Line-McKeever, SH 5248, Alder Creek-Lewis County Line, SH 5427, Boonville-Port Leyden Pts. 1 & 2, SH 8472, Rte. 12, FARC 59-12, Proj. F-1157 (1), Oneida Co.

N. Y.—Parlor City Constr. Co., 1117 Pray St., Endwell, N. Y., CA $689,884, bit. conc. Type 1A pavt., 4.44 mi., Ithaca-Danby, Pt. 3, SH 5213, Rte. 96B, FARC 59-10, Proj. F-49 (1), Tompkins Co. Bids Apr. 23. CD 4-24, under LB.

Menzies Constr. Co., Center Rd., West Seneca, N. Y., LB $179,630, bridge over Cayuga Creek on Three Rod Rd., Town of Alden, BUFFALO, N. Y. Bd. Supervisors, Erie County, [illegible] BUFFALO, N. Y. Bids May 20. CD 5-19.

Triton Constr. Co., 60 Court St., Brooklyn 2, N. Y., LB $638,200 (1), general contract, municipal incinerator, Proj. No. 10-426 P., NEW ROCHELLE, N. Y. Arthur F. Jonas, P.E., deputy dir. P. Wks., City Hall Annex, 2nd Fl., 30 Church St., New Rochelle, N. Y. Bids June 5. CD 5-4.

Clayburn Contg. Corp., 3 Hunter St., Long Island City, N. Y., LB $354,934 (2), furnace multiple incinerator (New Rochelle, N. Y.).

▲ Slattery Contg. Corp., 46-36 54th Rd., Maspeth, N. Y., LB $5,616,000 (6 bidders), IRT Express Station at E. 59th St. and Lexington Ave., NEW YORK, N. Y. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids June 5. CD 4-10.

▲ NEW JERSEY—State Hy. Dpt., 1035 Parkway Ave., Trenton. Bids opened 6-4.

George M. Brewster & Son, 275 Fort Lee Rd., Bogota, N. J., LB $3,888,040 (10 bidders), grading, paving 2.8 mi. Interstate Rte. 287 between River Rd. (Temp. NJ 18), Piscataway Twp. to Weston Canal Rd., Franklin Twp., Middlesex and Somerset Counties. CD 5-19.

† U. S. Eng., First and Douglas Sts., N.W., Wash. 25, D. C., rejected bids Apr. 30, heating plant, ENG-49-080-59-28, 29, ANDREWS AIR FORCE BASE, MD. LB $549,062. Will re-advertise. CD 5-5, under LB.

Steiner Constr. Co., 2122 Maryland Ave., Baltimore, Md., LB $532,000 (12 bidders), athletic fieldhouse and swimming pool covering, GARRETT PARK, MD. Georgetown Preparatory School, Garrett Park, Md. Bids June 4. CD 5-25.

Drummond & Co., Race Rd., Elkridge, Md., LB $401,777, [illegible] road, [illegible] Ave., near Dundalk, TOWSON, MD. Baltimore County, Executive, County Office Bldg., Towson 4, Md. Bids June 2. CD 5-22.

Henkels & McCoy, 6100 N. 22nd St., Phila. 41, Pa., LB $654,623 (7 bidders), Porter Filter Plant addns., will add 8 mgd. to facility's filtering capacity, WILMINGTON, DEL. Bd. Water Comm., Wilmington, Del. Bids June 3.

BUILDINGS—LB & CA

▲ William L. Crow Constr. Co., 101 Park Ave., New York 17, N. Y., CA Est. $5,000,000, GALLERY of MODERN ART, Columbus Circle and W. 58th St., NEW YORK, N. Y. Huntington Hartford Enterprises, 15 E. 48th St., New York 17, N. Y. Edward D. Stone, 38 E. 65th St., New York 21, N. Y., archt. CD 4-30.

Ganguzza Bros., Wenonah Rd., Woodcliff Lake, N. J., CA $700,000, 20,000 sq. ft. SUPERMARKET, HILLSDALE, N. J. Nelson & Sons, 207 Broad Ave., Palisades Park, N. J. Valley Fair Super Market. Lester Cohen, 234 Clinton Place, Hackensack, N. J., archt.

Hathaway Bros., 301 Greenwood Ave., Madison, N. J., Owner Builds, $850,000, 26 HOUSES, Garfield Ave., MADISON, N. J. Walter Pfeiffer, 10 Washington St., Morristown, N. J., archt.

Minetto Homes, Rivervale Rd., Norwood, N. J., Owner Builds, $500,000, 25 HOUSES, Rivervale Ave., NORWOOD, N. J. Hansen & Johns, 60 Westervelt Ave., Tenafly, N. J., archts.

▲ Rand Constr. Co., Inc., 114 E. 32 St., New York 16, N. Y., CA $1,636,800 (8 bidders), 4 cargo DISTRIBUTION BLDGS., No. 197, 198, 261 and 262, Contr. PN-560.004, PORT NEWARK, N. J. The Port of New York Auth., Rm. 1100, 111 Eighth Ave., New York 11, N. Y. Bids May 19. CD 5-25, under LB.

▲ Rust Engineering Co., 930 E. Duquesne Blvd., Pittsburgh, Pa., CA Est. $17,000,000, design and construct expan. Butler Works to enlarge stainless steel facilities, BUTLER, PA. Armco Steel Corp., 1937 Armco Ave., Middletown, O.

▲ Toro-Development Co., 106 College Park Dr., Monroeville, Pa., CA Est. $20,000,000, RESIDENTIAL SUB-

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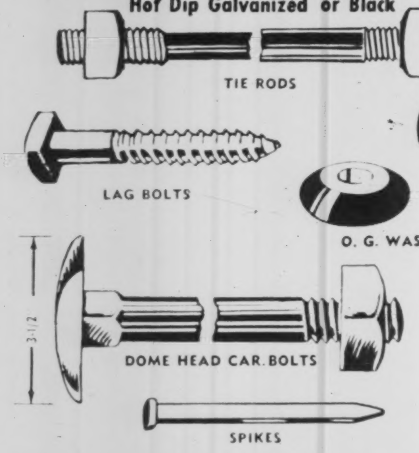

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A. E. Minstein Constr. Co., 864 Willis Ave., Albertson, N. Y., LB $494,000, general constr. existing ENGINEERING BLDGS. addns., alterations Pa. State University, UNIVERSITY PARK, PA. General State Auth., 18th and Herr Sts., Harrisburg, Pa. Bids June 3. CD 5/7.

▲† Arthur Venneri Co., 1816 Jefferson St. N.W., Wash., D. C., CA $4,370,000, National LIBRARY of MEDICINE, National Institutes of Health, Proj. No. 18096, BETHESDA, MD. General Services Admin., 7th and D Sts. S.W., Wash. 25, D. C. Bids May 5. CD 5/6, under LB.

▲ Charles E. Smith, Southern Bldg., Wash., D. C., CA $2,000,000, 13 story OFFICE bldg. and GARAGE, 1725 Pennsylvania Ave. N.W., WASH., D. C. D. F. Antonelli, 1719 DeSalles St. N.W., Wash., D. C. Edwin Weihe, 810 18 St. N.W., Wash., D. C., archt. CD 9/25/57.

SOUTH

HEAVY CONSTRUCTION—BA

Fla., Tampa—BA 6/25—City, City Hall, vehicular bridge across Hillsboro River on Sligh Ave. $500,000. Plans deposit $50. J. E. Greiner Co., 207 N. Franklin St., engr.

† La., New Orleans—ADMINISTRATION BLDG.—BA 6/25—Officer in Charge of Constr., Eighth Naval Dist., Bldg. 16, U. S. Naval Station, New Orleans (Algiers), La., administration bldg., Naval Air Station, Alvin Callender Field. NBy-22516, Spec. No. 22516. $250,000-$500,000.

▲ Ga., Waycross—BA 7/2—City, City Hall, sewage disposal plant. $1,000,000. Plans deposit $50. Wiedeman & Singleton, P. O. Box 1878, Atlanta, engrs. CD 2/11.

▲ Ky., Shively—BA 7/8—City, sanitary sewerage sys. $1,652,000. J. Stephen Watkins & Robert F. Martin, 5402 Preston Hy., Louisville, engrs. CD 2/5.

W. Va., Dunbar—BA 7/13—City, City Hall, interceptor, lift stations, plant, mains, $720,000. Kelley-Gidley-Staub, Inc., 5418 MacCorkle Ave. S.W., Charleston, engrs. CD 7/25/55.

BUILDINGS—BA

▲ W. Va., Charleston—FEDERAL—BA 6/25—General Services Admin., 18 and F Sts., Wash. 25, D. C. 5 story Federal Bldg., Quarrier St. between Court and Laidley Sts. $4,220,000. CD 4/10/58.

BUILDINGS—SLC

N. C., Valdese—HOSPITAL—Valdese General Hospital, c/o Waldensian Presbyterian Church, soon lets contract hospital. J. N. Pease & Co., 2925 North Independence Blvd., Charlotte, archts.

HEAVY CONSTRUCTION—LB & CA

VIRGINIA—Commonwealth of Va., Dpt. Hys., Room 400, Central Hy. Office Bldg., 1221 E. Broad St., Richmond. Bids opened 6/3.

Va.—McDowell & Wood, Inc., 1308 W. Main St., Salem, Va. LB $268,583 (13 bidders), 2 bridges beginning 1.081 mi. E. Int. Rte 52 ending 1.718 mi. W. Wythe-Pulaski Co. line, Rte 81, Contr. No. 2, State Proj. 0081-098-005-006, Fed. Proj. I-81-1 (4) 79, Wythe Co.

Va.—Thorington Constr. Co., Inc., 2106 N. Hamilton St., Richmond, Va. LB $689,961 (16 bidders), 7 bridges beginning 2.390 mi. S. Henrico-Hanover Co. line ending 0.368 mi. N. Int. Rte 54, Rte 95, State Rte 0095-043-101, B1, B2, 0095-042-101, B1, B2, B3, B4, B5, Fed. Proj. I95-1 (21) 87, I95-2 (2) 90, Henrico and Hanover Counties. CD 5/11.

▲ VIRGINIA—Commonwealth of Va., Dpt. Hys., Central Hy. Office Bldg., 1221 E. Broad St., Richmond. Bids opened 6/3.

Va.—Pendleton Constr. Corp., Box 549, Wytheville, Va. LB $1,058,271 (17 bidders), grade, drain 4.13 mi. beginning 1.081 mi. E. Int. Rte 52, ending 1.718 mi. W. Wythe-Pulaski Co. line, Rte 81, Contr. 1, State Proj. 0081-098-008-G1, Fed. Proj. I-81-1 (4) 79, Wythe Co.

Va.—D. W. Winkelman Carolina Co., Inc., Box 660, Greensboro, N. C., LB $449,456 (7 bidders), 1.181 mi. 2 lanes 22 ft. x 5½ in. b. conc. b.t. top 3.101 N. Int. Rte 413 ending 1.436 mi. S. Arlington C. L. Rte 123, State Proj. 0123-029-012, C2, C3, Fed. Proj. F-089-1 (7), Fairfax Co.

Va.—Atlantic Bitulithic Co., Inc., 1400 Roseneath Rd., Richmond, Va. LB $490,231 (5 bidders), 0.452 mi. widen exist. pavement to 2 lanes 24 ft. x 5½ in. c. conc. beginning 0.003 mi. W. WCL Richmond ending 0.455 mi. W. WCL Richmond, Rte 6, State Proj. 0006-043-101, C1, Fed. Proj. S-528 (14), Henrico Co. and 1.151 mi. 64 ft. x 6 in. c. conc. etc. 2.578 mi. W. 1914 Corp. Limits ending 1.427 mi. W. 1914 Corp. Limits, Rte 6, State Proj. 0006-127-072, Fed. Proj. US-127-2 (3), City of Richmond.

Va.—rejected bids June 3. 1.201 mi. 20 ft. x 8 in. aggreg. base, Type I b.t. surf. treat. beginning 1.201 mi. W. Int. Rte 16 (near N. Tazewell) ending Int. Rte 16 (near N. Tazewell), Rte 631, State Proj. 0631-092-019, Fed. Proj. S-781 (4), Tazewell Co. CD 5/11.

Industrial Builders, P. O. Box 1628, Anderson, S. C., LB $479,702, sanitary sewer improv., Contract 2, sewage treatment plant, [illegible] PA [illegible] Noll Constr. Co., P. O. Box [illegible], Charlotte, N. C.

(Continued on page 225)

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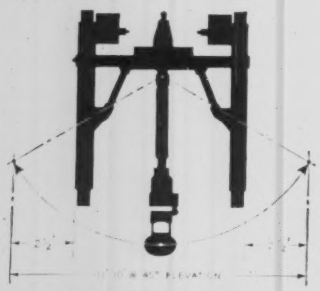
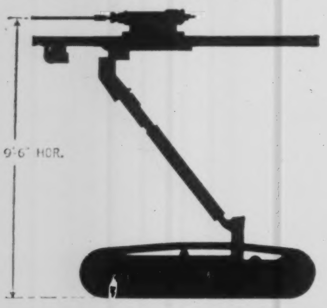
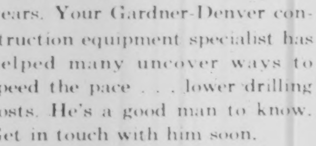


...MORE REACH



...MORE FOOTAGE

with Gardner-Denver Swing-Boom "Air-Trac"®



TIME TO TALK TIME-SAVING

Gardner-Denver believes there's no substitute for men—it has been our philosophy of growth for 100 years. Your Gardner-Denver construction equipment specialist has helped many uncover ways to speed the pace . . . lower drilling costs. He's a good man to know. Get in touch with him soon.

Swings 11'10" . . . 2½' over both tracks Now drill more hole from one position . . . drill over a ledge from either side. Feed swings 11'10" at 45° elevation . . . moves to 2½' outside of each track with balanced stability.

Reaches to 9'6" height—for horizontal drilling Get better spacing of horizontal holes . . . reach to 9'6" for high breast holes.

Moves quickly . . . safely "Air Trac" is self-equalizing, self-stabilizing, with hydraulic track oscillation. Moves easily, safely over roughest terrain. Designed with an unusually low center of gravity for maximum stability. Long tracks and powerful crawler motors provide plenty of traction. "Air Trac" will pull its own compressor. Tracks available with rubber or steel pads.

Saves time . . . steps All controls conveniently located. Drilling and positioning controls grouped at the front of rig to save steps, setup and drilling time.

Pulls tight steel Powerful Gardner-Denver 5-cylinder radial air motor enables your driller to put the right pressure on the bit in all drilling situations . . . provides necessary pulling power to bring tight steel out of the hole.

Maintains hole alignment Easily handles in-line drilling . . . drilling in fitchery or fractured formations. Creep-free hydraulic boom keeps drill in position . . . track locks keep rig firmly in place in difficult drilling spots.

Drills fast, clean hole Gardner-Denver's line of powerful rock drills is most complete—six hard-hitting models to choose from.

Write for bulletin.

GARDNER-DENVER Since 1859

1959

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GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

(Continued from page 222)

LB $130,249: sanitary sewer imprvs., Contract 1 (sewer lines) (Gainesville, Ga.).

▲ FLORIDA State Rd. Dpt., Tallahassee
Cone Bros. Constr. Co., Box 1259, Tampa 1, Fla., CA $2,544,224 4-lane divided 9-in. plain cement pavement [illegible] limerock base [illegible] limerock base [illegible] with binder course 1 concrete box culvert of bridge length, 4 grade separation bridges, concrete slab on prestressed beams with concrete piers founded on prestressed concrete piles 2.193 mi. SR 400 FAI Proj. No. I-4-2 (23) 22 Job No. 10190-3413 [illegible] Co. CD 5-26, under LB

▲ R. H. Wright Inc., 1050 NE 5 Terrace, Fort Lauderdale, Fla., CA $1,449,000, dredging and stockpiling approx. 3,000,000 cu. yd. fill material along north side of [illegible] St. Causeway at Miami, FAI Proj. Nos. I-A-95-1 (3) 5 Contr. A Job No. 87090-3407; I-95-1 (28) 4, I-95-1 (43) 5 and I-95-1 (42) 5 Contr. A Job No. 87270-3413 and State Proj. Job No. 87040-3503 SR 25 and 9, Dade Co. FLORIDA State Rd. Dpt. [illegible] Bayfront Park, Miami, Fla. Bids May 22. CD 5-28, under LB

L. F. Wilder Constr. Co., 14 Center Point, Birmingham, Ala., CA $715,990, [illegible] FORT PIERCE, FLA., City [illegible] Fort Pierce, Fla. Bids Mar. 16. CD 4-2, under LB

Duval Engineering & Contg. Co., 1746 E. Adams St., Jacksonville, Fla., LB $840,738, expressway roadwork [illegible] JACKSONVILLE, FLA. Jacksonville Expressway Auth., 1022 Main St., Jacksonville, Fla. Bids June 2. CD 5-25

E. M. Fleming Constr. Co., 4121 NW 25 St., Miami, Fla., LB $794,999 grandstand, 1 South Collins Ave., MIAMI BEACH, FLA. Miami Beach Kennel Club, 1 South Collins Ave., Miami Beach, Fla. Bids May 26. CD 5-20

BUILDINGS—LB & CA

▲ George W. Kane, Jefferson Bldg., Greensboro, N. C., LB $1,061,588 115,000 sq. ft. Turrentine JUNIOR HIGH SCHOOL, BURLINGTON, N. C. City Bd. Educ., Burlington, N. C. Bids May 26. CD 5-2

W. E. Dale Constr. Co., Morganton, N. C., LB $449,449 50,000 sq. ft. North Mecklenburg JUNIOR HIGH SCHOOL, MECKLENBURG, N. C. Mecklenburg Co. Bd. Educ., Charlotte, N. C. Marsh & Hawkins, Chatham Bldg., Charlotte, N. C., archts. Bids May 21.

Dickerson Inc., Monroe, N. C., LB $414,995 60,000 sq. ft. North Union HIGH SCHOOL, MONROE, N. C. Union Co. Bd. Educ., Monroe, N. C. Bids May 27. CD 5-8

▲ Daniel Constr. Co., 429 Main St., Greenville, S. C., CA Est. $2,000,000 PLANT addn., SIMPSONVILLE, S. C. Cryovac Div., W. R. Grace & Co., 3 Hanover Square, New York 4, N. Y.

▲ Sarno Land Co., P. O. Box 1298, Eau Gallie, Fla., Separate Contracts, $1,000,000, 51 RESIDENCES, EAU GALLIE, FLA.

Porte-Wagor-Russell, Inc., 9843 E. Fern St., Perrine, Fla., Owner Builds, $600,000, 41 RESIDENCES, SW 164 St. and SW 97 Ave. (Palmetto Country Club Estates) MIAMI, FLA. Gerald West, 299 Harbor Court, Key Biscayne, Fla., archt.

Giller & Fryd Constr. Corp., 524 Michigan Ave., Miami Beach, Fla., CA $787,400 ADMINISTRATIVE OFFICES alterations, 1410 NE 2 Ave. (Lindsey Hopkins Education Center) MIAMI, FLA. Dade Co. Bd. P. Instruction, Admin. Bldg. NW, 275 NW 2 St., Miami, Fla. CD 5-27, under LB

▲ Allen Bros. Constr. Co., 3556 Walker Ave., Birmingham, Ala., CA $1,000,000 MOTOR HOTEL, 2 and [illegible] Aves. and 13 and 14 Sts., BIRMINGHAM, ALA. George C. Wakefield, 358 Government St., Mobile, Ala. Field Hotel Corp. will operate. CD 12-18

▲ Badger Manufacturing Co., 230 Bent St., Cambridge, Mass., CA design and [illegible] DISTILLATION PLANT [illegible] SPRINGHILL, LA. Arkansas Chemical Co. (American Cyanamid Co. & International Paper Co.), 30 Rockefeller Center, New York, N. Y.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲† Mich., Marquette—BASE HOSPITAL, etc.—BA [illegible] Base Procurement Office, Marquette [illegible] base hospital, dental clinic [illegible] Air Force Base [illegible] $2,910,000 Smith, Hinchman & Grylls Assoc., Inc., 3107 W. Grand Blvd., Detroit, Zone 2, archt. CD 5-14

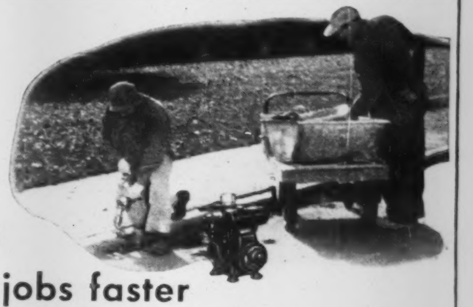
▲† Mich., Kinross—BASE HOSPITAL, etc.—BA [illegible] Washington Blvd., Detroit, base hospital, dental clinic, Kinross Air Force Base [illegible] $1,915,000 Smith, Hinchman & Grylls Assoc., Inc., 3107 W. Grand Blvd., Detroit, Zone 2, archt. CD 5-14

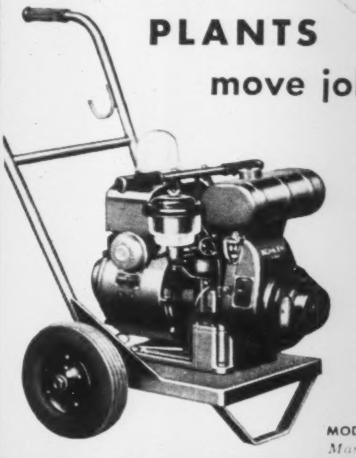
▲† Mich., Oscoda—HOSPITAL, etc.—BA [illegible] Base Procurement Office, Wurtsmith Air Force Base hospital and dental clinic, Wurtsmith Air Force Base [illegible] $2,139,000 Smith, Hinchman & Grylls Assoc., Inc., 3107 W. Grand Blvd., Detroit, Zone 2, archt. CD 5-14

BUILDINGS—BA

▲ O., Canton—CITY HALL—BA [illegible] City Hall [illegible] $2,969,000 [illegible] Ave., New York, N. Y., archts. CD [illegible]

▲ O., Marlboro—SCHOOL—BA [illegible] Bd. Educ., high school $1,[illegible] & Frost, 641 Wick Ave., Youngstown, archts. CD 11-14.





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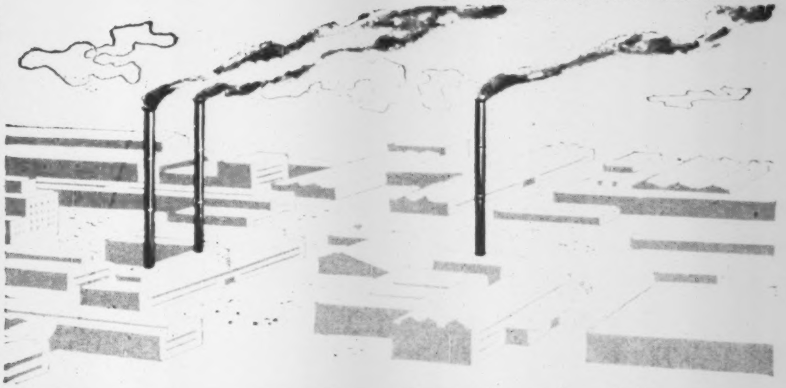
CIRCLE E-5 READER SERVICE CARD



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Gentlemen: Please send me a copy of the Permaglas Smokestack Bulletin No. SS-202.
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Firm______
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CIRCLE Y-9 READER SERVICE CARD

HEAVY CONSTRUCTION—LB & CA

▲ **Square & Marra Constr. Co.**, 4990 Mass Ave., Indianapolis, Ind., LB **$2,312,700**, Mill Creek Interceptor Sewer, Section No. 1, CINCINNATI, O. City, City Hall, Cincinnati, O. Bids June 2. CD 5 20.

▲ **INDIANA** — State Hy. Dpt., State House Annex, Indianapolis, Bids opened 5/28,

Ind.—**Contr. & Materials Co.**, Evanston, Ill., LB **$1,705,758**, est. $1,911,159 (10 bidders), c. conc. pavement, Contr. R-4651, I-05-2 (15), old I-74-2 (15) 64, Hendricks and Marion Counties, LB **$2,257,680**, est. $2,488,487 (7 bidders), c. conc. pavement, Contr. R-4710, I-01-1 (21), old I-465-4 (21) 145, I-65-3 (12) 123, Marion Co.;

Ind.—**Tri-Angle Constr.**, Ootic, Ind., LB **$619,939**, est. $623,025 (2 bidders), bit. surf. crushed aggr. base, Contr. R-4513, S-290 (1), Dearborn Co.;

Ind.—**Gast Constr. Co.**, Warsaw, Ind., LB **$843,958**, est. $872,512 (4 bidders), c. conc. pavement, Contr. R-4575, F-792 (8), Whitley Co.;

Ind.—**Ralph Myer Constr.**, Salem, Ind., LB **$513,226**, est. $593,657 (6 bidders), bit. surf. w.b. mac., Contr. R-4713, S-110 (5), Washington Co.;

Ind.—**Rieth-Riley Constr.**, Goshen, Ind., LB **$1,002,640**, est. $1,134,612 (6 bidders), c. conc. pavement, Contr. R-4714, F-214 (5), Bartholomew Co.;

Ind.—**Traylor Bros., Inc.**, Upper Mount Vernon Rd., Evansville, Ind., LB **$1,888,806**, est. $2,164,619 (10 bidders), c. conc. pavement, rein.-con. arch, Contr. R-4715, S-302 (10), S-302 (11), Crawford and Harrison Counties;

Ind.—**McMahan Ill. Corp.**, Rochester, Ind., LB **$888,308**, est. $958,513 (3 bidders), c. conc. pavement, Contr. R-4722, U-829 (1), ST-154 D, U-154 (1), Tippecanoe Co. CD 5 14.

▲ **INDIANA** — State Hy. Dpt., State House Annex, Indianapolis. Bids opened 5 28,

Ind.—**Smith & Johnson, Inc.**, 1799 Kentucky Ave., Indianapolis, Ind., LB **$499,060**, est. $512,998 (3 bidders), Bridge Contr. No. 4653, Hancock Co.;

Ind.—**Kahl & Mahon**, 102 N. Main St., Liberty, Ind., LB **$503,297**, est. $616,028 (9 bidders), Bridge Contr. No. 4691, Wayne Co.;

Ind.—**Roy Ryan Sons' Co.**, 5416 Bowl Hy., Evansville, Ind., LB **$994,980**, est. $1,655,947 (5 bidders), Bridge Contr. No. 4702, Floyd Co., Ind. and Jefferson Co., Ky. CD 5 15.

▲ **INDIANA** — State Hy. Dpt., State House Annex, Indianapolis.

Ind.—**Gast Constr. Co.**, S. Columbia St., Warsaw, Ind., CA **$1,412,945**, est. $1,720,671, c. conc. 10.09 mi. US 30, Contr. R-4595, F-79 (11), Kosciusko and Whitley Counties;

Ind.—**Magaw Constr. Co.**, Hawkins Rd., Richmond, Ind., CA **$503,278**, est. $593,968, bit. base widen. and bit. surf. 14.112 mi., SR 1, Contr. RS-4668, S-518 (6), ST-182 D, Fayette Co. Bids Apr. 30, awarded May 13, CD 5 8, under LB.

▲ **INDIANA** — State Hy. Dpt., State House Annex, Indianapolis.

Traylor Bros., Inc., Station B, P. O. Box 66, Evansville, Ind., CA **$2,061,031**, est. $2,276,720, c. conc. 5.218 mi. US 31, Contr. R-4594, I-03-2 (19) I-03-2 (23), Jackson Co. CD 11 3, under LB.

▲ **ILLINOIS** — Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield.

General Paving Co., Inc., 30 E. John St., Champaign, Ill., CA **$2,238,322**, double paving and interchange 5.25 mi. with Urbana Spur F. A. I. Rte. 5, Champaign Co. Bids May 15. CD 5 20, under LB.

▲ **Sterling Drugs, Inc.**, 1450 Broadway, New York, N. Y., LB **$11,870,000** (1 bidder), Sewerage Div. YY, wet air oxidation process West Southwest Sewerage Treatment Works, 200 ton per day capacity, CHICAGO, ILL. Metropolitan Sanitary Dist. of Greater Chicago, 100 E. Erie St., Chicago, Ill. Bids June 4. CD 5 26.

WISCONSIN — State Hy. Comm., State Office Bldg., Madison.

Raemish Constr. Co., P. O. Box 87, Middleton, Wis., CA **$803,611**, grade and subbase 4.647 mi. Lake Delton-Madison Rd. (C.T.H. V-U.S.H. 51 Section and Hoffland Overpass approaches), IH 90 and 94, Contr. 1, Proj. I-90-2 (9) 126 and IG-90-2 (4) 130, Dane Co. Bids May 26. CD 6 1, under LB.

R. Beaudoin & Son, 7227 Maple Terrace, Wauwatosa, Wis., CA **$107,144**, (11 bidders), paving S. 68 St., MILWAUKEE, WIS. City, City Hall, Milwaukee, Wis. Bids May 29, awarded June 3.

▲ **MICHIGAN** — State Hy. Dpt., Mason Bldg., Lansing, Bids opened 6 3.

Mich.—**L. A. Davidson**, 213 E. St. Joseph, Lansing, Mich., LB **$3,460,727**, 4.4 mi. dual 24 ft. pavement and seven structures from Ridge Rd. north of Stevensville northeasterly to St. Joseph River, Berrien Co. CD 5 18.

Mich.—**Carl Goodwin & Sons**, Box 38, Allegan, Mich., LB **$2,399,315**, 5 mi. dual 24 ft. pavement and five structures from M 119 to Schussler Rd. and 1.3 mi. concrete pavement and one bridge on M 40 and M 119 south of Paw Paw, Van Buren Co. CD 5 18.

Mich.—**Ayling Asphalt & Paving**, 815 Treat, Adrian, Mich., LB **$270,446**, 13.8 mi. bit. conc. surf. US 127 from M 34 in Hudson north thru Addison to US 112, Hillsdale and Lenawee Counties. CD 5 27.

Mich.—**Spartan Asphalt Paving Co.**, South Cedar, Holt, Mich., LB **$232,042**, bit. conc. surf. 9.8 mi. four locations on M 37 and M 43 south of Battle Creek, south of Hastings in Hastings and in Middleville, Barry and Calhoun Counties.

Mich.—**Kutchins Co.**, 1516 Moores River Dr., Lansing, Mich., LB **$143,179**, grading, drainage structures, pav. [illegible] M-97 at intersection with Schoenherr Rd., Macomb Co.

Mich.—**A & A Asphalt Paving Co.**, 1045 Haynes, Birmingham, Mich., and **Lake & Howell Constr. Co.**, Howell, Mich. (joint venture), LB **$218,781**, b. conc. surf. 8.2 mi. US 12 from east of Lima Center Rd. east to Wagner Rd. and 6.9 mi. bit. aggreg. surf. M 132 from village of Dexter southeast to Ann Arbor, Washtenaw Co.;

Mich.—**Frank Strausberg & Sons**, 7361 Dixie, Saginaw, Mich., LB **$115,504**, bit. aggreg. surf. 20.4 mi. two locations on Atwater Rd. at two locations on Pinnebog Rd. and on Crescent and Elkton Rds., Huron Co.

Mich.—**A & A Asphalt Paving Co.**, 1045 Haynes, Birmingham, Mich., LB **$91,193**, b. conc. surf. 2.9 mi. 8 Mile Rd. from 3 mi. west of Northville west, Oakland Co.;

Mich.—**Taylor Brothers Co.**, 985 Haynes, Birmingham, Mich., LB **$374,762**, grading, drainage structures 1.9 mi. Northline Rd. from Middle Belt Rd. east to Beech Daly Rd., Wayne Co.

BUILDINGS—LB & CA

▲ **Wm. Passalaqua Builders**, 17300 Miles Ave., Cleveland 28, O., CA **$1,152,300**, general contract HIGH SCHOOL addn., CLEVELAND HEIGHTS, O. Bd. Educ., 1749 Lee Rd., Cleveland 18, O. Bids May 5. CD 5 12, under LB.

▲ † **Atomics International, Div. North American Aviation Inc.**, Downey, Calif., CA **$7,700,000**, total est. $14,500,000, design and construct ATOMIC POWER PLANT for city, PIQUA, O. Atomic Energy Comm., Germantown, Md. CD 10 2 56.

▲ **Virginia Engineering Co., Inc.**, 6900 English Ave., Indianapolis, Ind., CA **$15,100,025**, STATE OFFICE, INDIANAPOLIS, IND. State Office Bldg. Comm., Old Trails Bldg., 309 Washington St., Indianapolis, Ind. Bids Apr. 15. CD 4 21, under LB.

▲ **F. A. Wilhelm Constr. Co.**, 3914 Prospect St., Indianapolis, Ind., CA **$2,022,898**, general contract 620-room Dehority women's RESIDENCE HALL, MUNCIE, IND. Trustees, Ball State Teacher's College, Muncie, Ind. Bids Mar. 18, awarded May 28. CD 3 9.

▲ **Crouse Constr. Co.**, 9216 Clayton Rd., Ladue 24, Mo., CA est. over **$2,000,000**, first section 62,800 sq. ft. SHOPPING CENTER, 9 stores, filling station, parking for 802 cars on Hy. 157 adjacent to Range Line, CAHOKIA (EAST ST. LOUIS, P. O.), ILL. Cahokia Village Shopping Center, 822 Chestnut St., St. Louis 1, Mo. M.C.A. Construction-Engineering Factors of St. Louis, 9216 Clayton Rd., Ladue 24, Mo., archts.-engrs.

▲ **Oliver G. Parks Realty Co., Inc.**, 815 St. William St., Cahokia, Ill., Owner Builds, **$1,800,000**, 300 RESIDENCES addn. in St. Joseph's Gardens Subdivision

(Continued on page 229)

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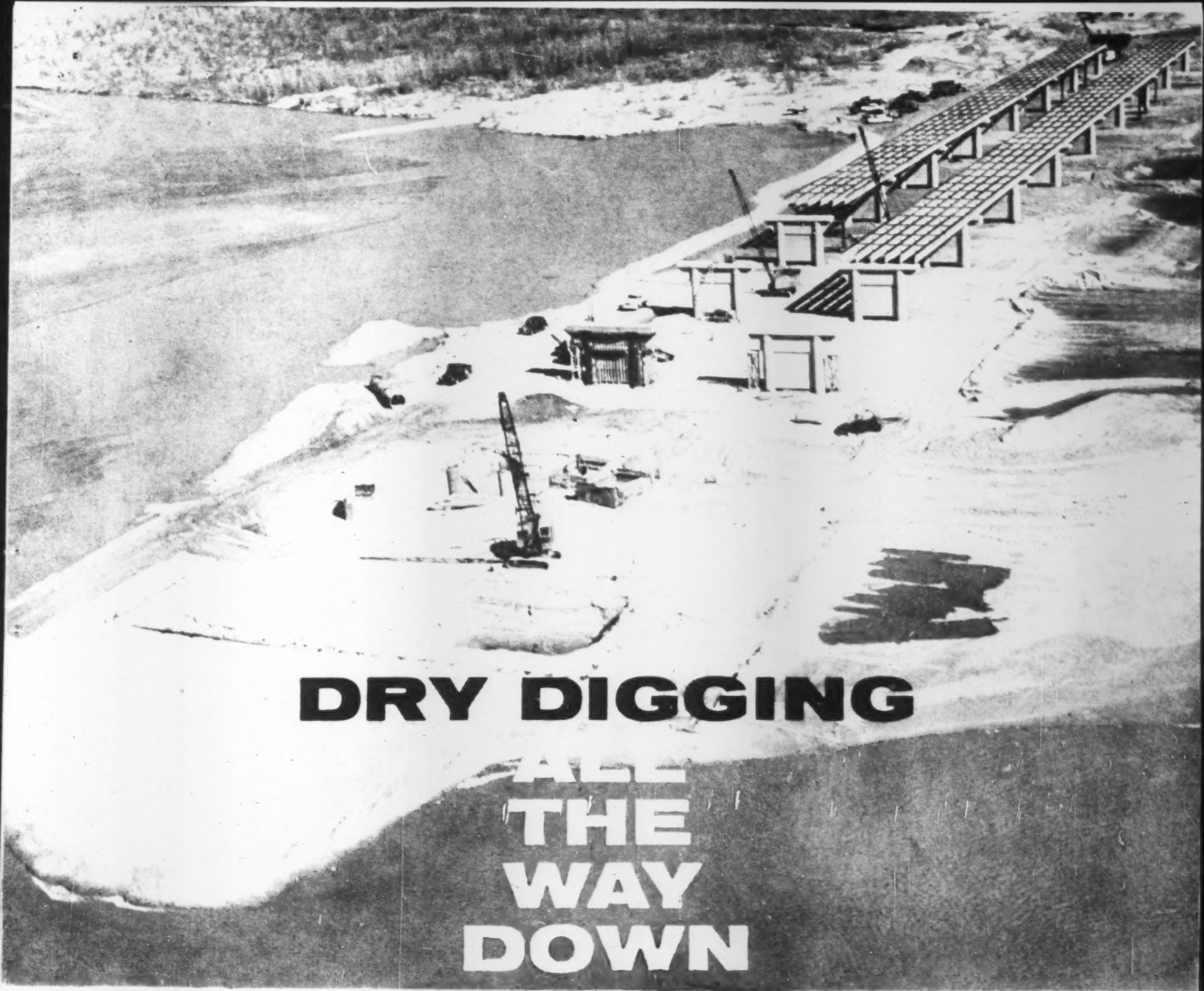

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Contractor: Duard Pyle, Oklahoma City, Oklahoma
Cecil Williams, Supt.

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Excavating for these riverbed bridge piers required efficient, accurate water control. The method chosen to accomplish this had to be sufficiently effective to dewater 24' to subgrade, yet flexible enough to move on to the next landing as the piers were placed. At the request of the contractor, engineers of the John W. Stang Corporation analyzed the problem and promptly recommended wellpointing as the best solution. Why a wellpoint system? Because it afforded pinpoint accuracy in the area being dewatered, it did not inhibit the excavating with shoring, braces or equipment in the hole, and it was economical and reliable to operate.

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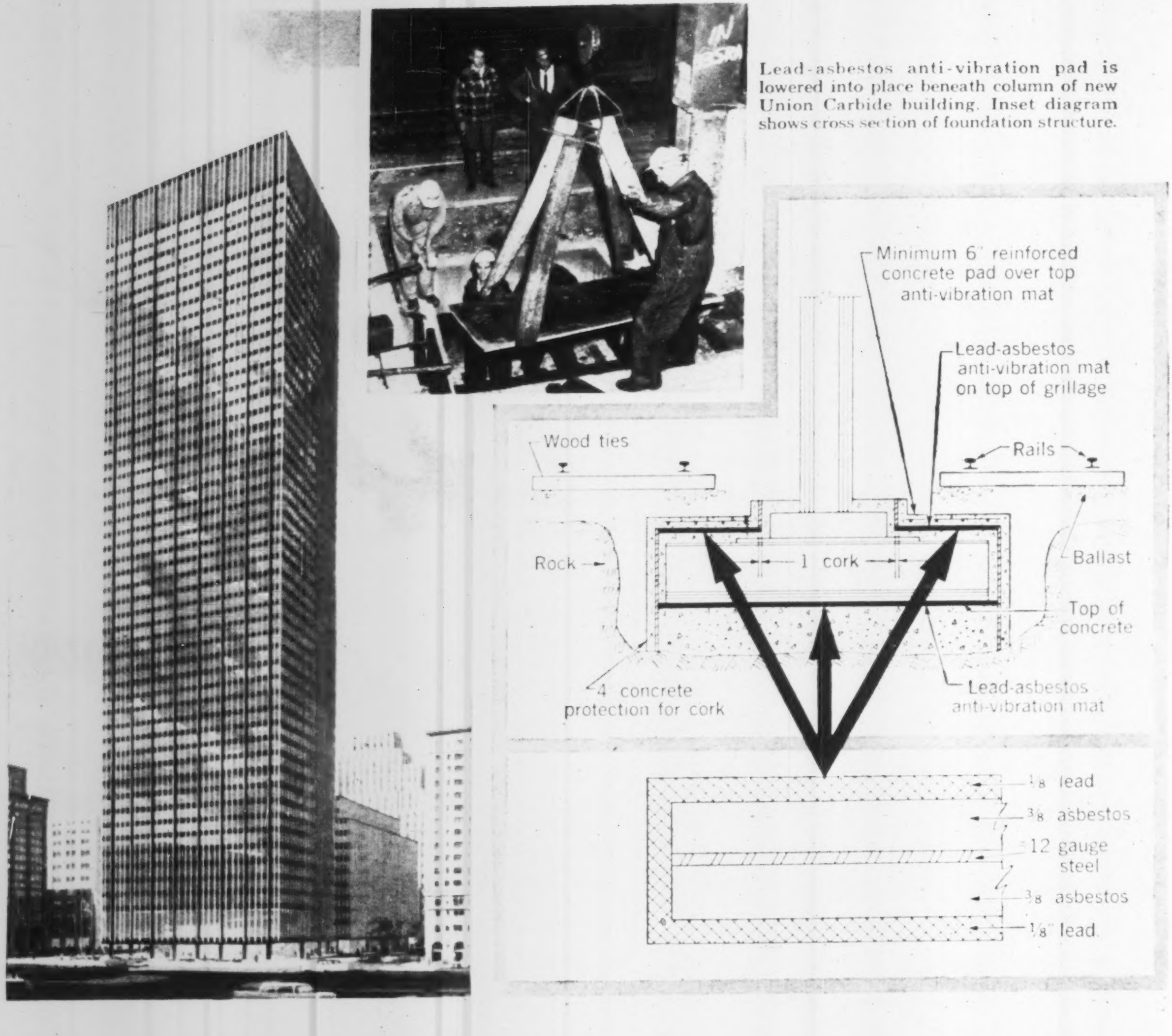
WAverly 1-9936


Minimum 6" reinforced concrete pad over top anti-vibration mat
Lead-asbestos anti-vibration mat on top of grillage
Wood ties
Rails
Rock
1" cork
Ballast
Top of concrete
4" concrete protection for cork
Lead-asbestos anti-vibration mat
⅛" lead
⅜" asbestos
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⅜" asbestos
⅛" lead

Lead-asbestos anti-vibration pad is lowered into place beneath column of new Union Carbide building. Inset diagram shows cross section of foundation structure.

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The reason for this continued choice and endorsement of lead? Lead's vibration-damping properties, plus its resistance to corrosion, its malleability and its lack of resilience. And lead's durability makes sure that the pads will last for the life of the building.

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Lead Industries Association

60 East 42nd Street New York 17, N. Y.

2395

(Continued from page 226)

[illegible] Owner Builds $900,000, 150 RESIDENCES, [illegible] Gardens, CAHOKIA, ILL., East St. Louis, P.O.

Wm. J. Shaffer, [illegible] Ave., [illegible], Wis.: CA Est. $400,000, general contract, PAROCHIAL SCHOOL, MILWAUKEE, WIS., SS Cyril & Methodius Catholic Congregation, 1347 W. Windlake Ave., Milwaukee, Wis. Awarded May 1959. S. A. Pyzik, 1401 W. Oklahoma Ave., Milwaukee, Wis., archt.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

† N. M., Clovis, RUNWAY, PRIMARY OVERRUN—BA 6-25 [illegible] Engr., P. O. Box 1580, Albuquerque: [illegible] 150 x 1,000 ft. runway overrun sections, relocating 2 runway barriers and airfield lighting, [illegible] Cannon A. F. Base. ENG-29-[illegible]. $100,000-$500,000. CD 6-13.

▲† Arkansas—BA 7-23, [illegible] Engr., P. O. Box 867, Little Rock: design, manufacture, deliver, install and field test two 50,526-kva, 13,800-volt alternating current generators, complete with spare parts, Greers Ferry Dam and Reservoir. CIVENG-03-505-59-67. $1,000,000-$3,000,000.

BUILDINGS—BA

▲ Minn., St. Paul, OFFICE—BA 6-24—St. Paul Fire & Marine Insurance Co., 111 West Fifth St.: 5-story office, Washington and Fifth Sts. $6,300,000. Childs & Smith, 20 North Wacker Dr., Chicago 1, archts. CD 2-11.

BUILDINGS—SLC

Mo., Columbia, DORMITORIES, Stephens College, Broadway and College St.: soon let contract two dormitories (A) 4-story, 59 x 122 ft.; (B) 4-story, 60 x 146 ft. (CFA Proj. No. Mo. [illegible]). Murphy & Mackey, 6124 Enright Ave., St. Louis, Zone 12, archts.; Neal Campbell, [illegible], St. Louis, Zone 1, [illegible] engr. CD 5-14.

HEAVY CONSTRUCTION—LB & CA

▲ MISSOURI—State Hy. Dpt., Jefferson City:

Mo.—J. A. Tobin Constr. Co., [illegible] Rainbow Blvd., Kansas City, Kan.: CA $876,412, graded earth, storm sewers, concrete pavement [illegible] mi., [illegible] Co.; CA $1,072,540, 24 ft. concrete pavement 3.622 mi., Platte Co.; CA $2,131,163, graded earth, storm sewers, concrete pavement 2.931 mi., [illegible]

Mo.—Fred Weber Contr., Inc., 7929 Alabama Ave., St. Louis 11, Mo.: CA $1,799,693, [illegible] concrete pavement [illegible] mi., [illegible] City. CD 6-[illegible] under LB.

Mo.—Massman Constr. Co., 1917 Broadway, Kansas City 11, Mo.: CA $233,196, 24 ft. concrete pavement 0.929 mi., Cole Co.; CA $203,922, 24 ft. concrete pavement 0.771 mi., Osage Co. Grand total $6,316,926. Bids May 22—awarded May 28. CD 6-3 under LB.

▲ Fred Weber Contractor, Inc., 7929 Alabama Ave., St. Louis 11, Mo.: LB $3,626,116, est. $4,652,000 (7 bidders): installing 28 mi. 78-in. high pressure steel water mains from Chain of Rocks Waterworks Plant to Bissell's Point and Baden Pumping Stations, ST. LOUIS, MO. Bd. Pub. Service, 324 City Hall, St. Louis 3, Mo. Bids June 2. CD 5-4.

▲† List & Clark Constr. Co., 2 West 40th St., Kansas City, Mo.: LB $2,575,653, est. $2,637,724 (11 bidders): Pomona Dam, Stage 1, near Ottawa, ENG-23-028-59-162. KANSAS, U. S. Engr., 1800 Federal Office Bldg., Kansas City, Mo. Bids June 4. CD 4-[illegible]

Upper Neches River Municipal Water Auth., Jacksonville, Tex.: [illegible] bids to have been opened June 10, Stage 2, Blackburn Crossing Reservoir: [illegible] JACKSONVILLE, TEX. Est. $800,000. CD 5-15.

▲ Olson Constr. Co., 410 S. 7th St., Lincoln, Neb.: CA Est. $4,000,000, general contr., Gateway SHOPPING CENTER, near O St. and Cotner Blvd.: [illegible] Montgomery Ward Store and 2-story 117,000 sq. ft. outdoor sales area, 12-unit auto service station, super market and retail store, LINCOLN, NEB. [illegible] Co. of Nebraska, Cotner Blvd. and O St., Lincoln, Neb. Draper & Kramer, Chicago, Ill., agents and lessees. Loebl, Schlossman & Bennett, 333 N. Michigan Ave., Chicago 1, archts. CD 6-18-58.

▲† Hoak Constr. Co., [illegible] St., West Des Moines, Iowa: CA $1,513,368, power transmission line from Kortes to Cheyenne, Missouri River Basin Proj., Spec. DC-5169, WYOMING—Bureau Reclamation, Dpt. Interior, Casper, Wyo. Bids May 5. CD 5-7 under LB.

COLORADO—State Hy. Dpt., 4201 East Arkansas, Denver:

John W. Brown Constr. Co., 4121 East Colfax Ave., Denver, Colo.: CA $366,262, est. $392,000 [illegible]: bridge approaches on State Hy. No. 3 and Vasquez and Colorado Blvds. Colorado Proj. No. [illegible]. Bids June 2. CD 6-[illegible]

BUILDINGS—LB & CA

▲ M. Mandel, Inc., 1214 Plymouth Ave., Minneapolis, Minn.: CA $1,065,000, general contract, HIGH SCHOOL, WEST ST. PAUL, MINN. Bd. Educ., West St. Paul. [illegible] May 26. CD 6-[illegible] under LB.

▲ Dickie Constr. Co., 317 N. 11th St., St. Louis, Mo.: LB $1,562,100 [illegible]: general contract, 4-story, [illegible] 200-bed MENTAL DISORDER NEW PATIENTS ANNEX to [illegible] 5 Brentwood Blvd., CLAYTON, MO. [illegible] St. Louis County [illegible] Clayton 5, Mo. Bids June [illegible]

Natkin Co., 5555 Manchester Ave., St. Louis 10, Mo.: LB $426,450, heating, ventilating and air conditioning [illegible] Patients Annex, St. Louis County Hospital [illegible] Mo.

R.D.B. Builders, Inc., c/o Wilson & Co., 8112 St. Charles Rock Rd., Overland 14, Mo.: Owner Builds [illegible] 000, 204 RESIDENCES, Whitney Park Subdivision, [illegible] ST. LOUIS COUNTY, MO.

▲ Harmon Constr. Co., 26 S. Indiana St., Oklahoma City, Okla.: CA $1,703,384, general contract, 6-story and basement 65,000 sq. ft., brick, concrete T. H. Barton Institute for MEDICAL RESEARCH BLDG., adjoining present hospital at floors 1 thru 6, with [illegible] bridge, LITTLE ROCK, ARK. University of Arkansas Medical Center, Little Rock, Ark. Bids May 25. CD 6-1 under LB.

† Korshoj Constr. Co., Inc., 1545 Washington St., Blair, Neb.: LB $742,000 (4 bidders): alterations and additions to Bldgs. 2 and 4 and alterations to Bldg. 5, Veterans Admin. HOSPITAL, LINCOLN, NEB. Veterans Admin., Munitions Bldg., Wash., D. C. Bids June 2. CD 4-23.

Phil S. Hardy Constr. Co., 205 Texas City Hall, Texarkana, Tex.: CA $422,971, general contr., WAREHOUSE, SHOPS, SERVICE STATION, Proj. MC 19-[illegible], ATLANTA, TEX. State Hy. Dpt., Austin, Tex. Bids May 12. CD 5-27 under LB.

▲ McClendon Constr. Co., P. O. Box 1103, Longview, Tex.: LB $1,139,000 (10 bidders): EDUCATION and HOME ECONOMICS, DENTON, TEX. North Texas State College, Denton, Tex. Bids June 3. CD 5-8.

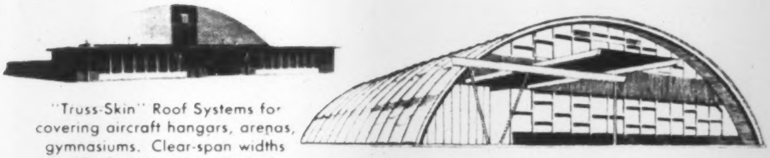
D. W. Marshall Constr. Corp., Box 527, Victoria, Tex.: CA $532,190, COMPRESS WAREHOUSES, SHOP, EL CAMPO, TEX. Gulf-Tex Compress & Warehouse Corp. [illegible] Rowett & Scott, [illegible] engrs., 1400 Montrose Blvd., Houston, Tex. Bids Feb. 26. CD 4-30 under LB.

Pacesetter Homes, Inc., 6535 Richwood St., Houston, Tex.: Owner Builds $424,300, 18 DWELLINGS; $420,000, 12 DWELLINGS, Meyerland Meadows, HOUSTON, TEX. [illegible]

▲ D. W. Marshall Constr. Co., Box 527, Victoria, Tex.: CA $1,260,000 (12 bidders): 3-story BANK OFFICE addn. and 4-story bldg. expansion, remodeling, VICTORIA, TEX. Victoria Bank & Trust Co., 120 S. Main St., Victoria, Tex. Bids May 21. CD 5-27 under LB.

▲ Hewson Constr. Co., 3894 South Elm St., Denver, Colo.: CA $3,900,000, thirty 8-unit APARTMENT BLDGS., [illegible] Martin Estate, South Monroe and [illegible] Evans, DENVER, COLO. Park [illegible] Apartment Homes, Inc., 3894 South Elm, Denver, Colo.

(Continued on page 234)



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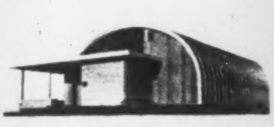

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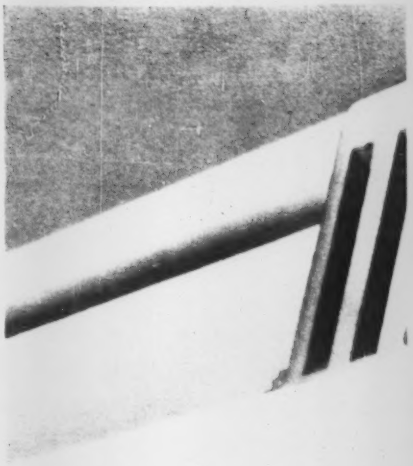
TSR-109

CIRCLE Z-4 READER SERVICE CARD

ALL
THE WAY
FROM
INDIANA...
60,000 FEET OF



Flynn aluminum post-and-rail combinations were used for more than 60,000 rail-feet of bridge, overpasses, and approaches on the Northern Illinois Toll Highway. Starting at the Indiana border, it stretches for 187 miles.

This superhighway is another example of the many important works where one of Flynn's many attractive, economical standard rail-and-post designs was used. Others include the Chicago Calumet Toll Highway, the Southeast Expressway near Boston and Philadelphia's impressive new Walt Whitman bridge. Of course, you can order custom designs from Flynn, too.

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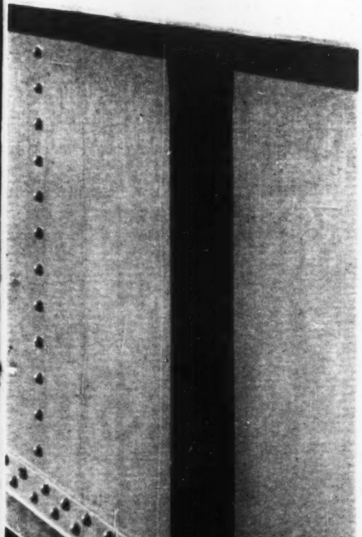

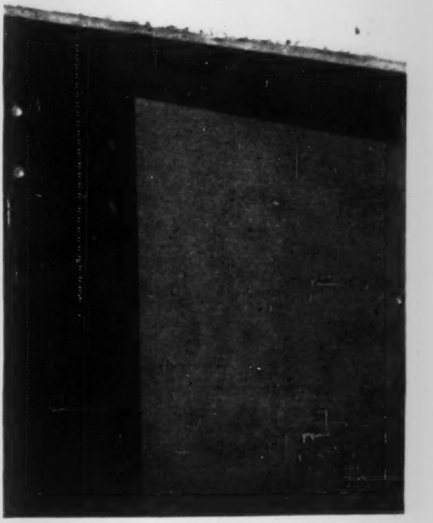

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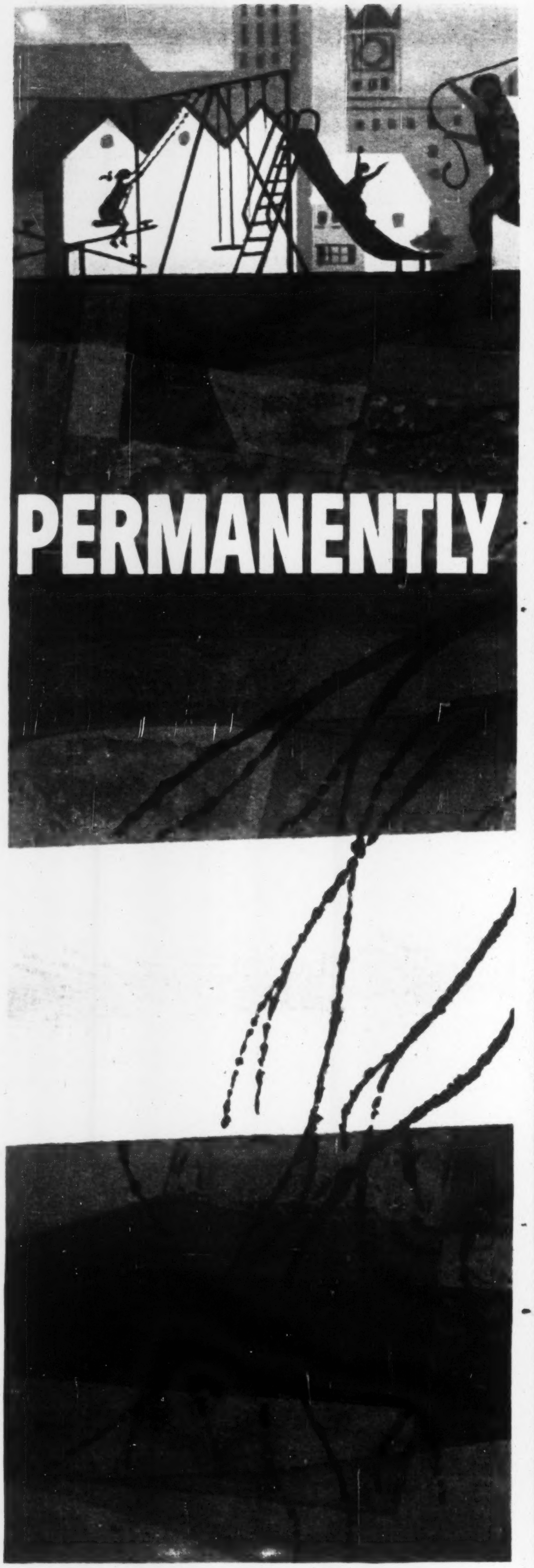
This single-rail installation with Flynn CP-191 standard cast posts, is part of the 60,000 rail-feet of post-and-rail combinations supplied and installed on the Northern Illinois Toll Highway by Michael Flynn Manufacturing Company. Chief Engineer: George L. Jackson. Consulting Engineers: Joseph K. Knoerle and Associates, Inc. Photograph: Hedrich-Blessing.

K&M ASBESTOS-CEMENT SEWER PIPE



Sewer pipe maintenance headaches disappear when you install "K&M" Asbestos-Cement Sewer Pipe.

Flow-stopping, pipe-clogging roots . . . no matter how cobwebby-thin . . . can't penetrate the exclusive patented "K&M" FLUID-TITE coupling . . . unmatched in its tight sealing. In repeated tests, "K&M" Asbestos-Cement Sewer Pipe successfully resisted infiltration even when external water pressure was 25 psi . . . the equivalent of a 58-foot head and way above field conditions.

Service remains continuous and uninterrupted . . . with fewer inspections and periodic cleanings. You can reduce treatment loads and costs . . . because infiltration is eliminated. Being made of quality asbestos fibers and portland cement, "K&M" Sewer Pipe does not corrode and is immune to electrolysis.

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In short, practically indestructible materials plus eighty-five years of asbestos engineering give you the finest, most dependable sewer pipe available. That's why we urge you to write today for more information.

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Size Inches	Class 1500	Class 2400	Class 3300	Class 4000	Class 5000
6	1500	2400	3300		
8	1500	2400	3300		
10	1500	2400	3300	4000	5000
12	1500	2400	3300	4000	5000
14	1500	2400	3300	4000	5000
18	1500	2400	3300	4000	5000

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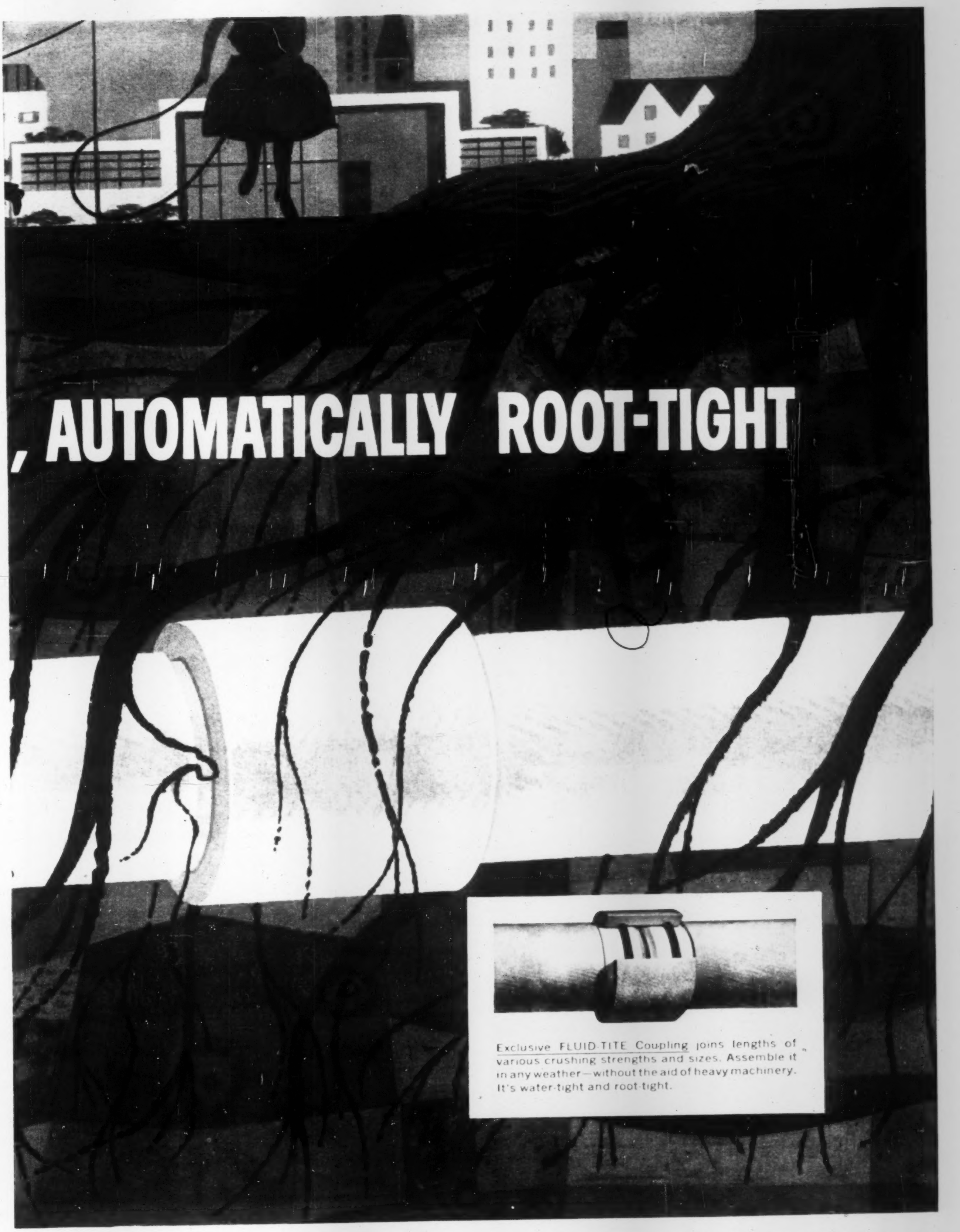
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Exclusive FLUID-TITE Coupling joins lengths of various crushing strengths and sizes. Assemble it in any weather—without the aid of heavy machinery. It's water-tight and root-tight.

CIRCLE Z-7 READER SERVICE CARD

(Continued from page 229)

▲ **Harvey Stenmark Constr. Co.**, 285 S. Williams St., Denver, Colo., CA **$1,737,000**, Alameda SENIOR HIGH SCHOOL, LAKEWOOD, COLO. School Dist. R-1, 1580 Yarrow, Lakewood, Colo. Bids May 26. CD 6/2, under LB.

FAR WEST

HEAVY CONSTRUCTION—BA

▲ **Calif., Los Angeles**—BA 6/26—Los Angeles Co. Flood Control Dist., 2250 Alcazar St., rein.-con. conduit for Dominquez Channel, Gramercy Pl. to Redondo Beach Blvd. Torrance. $1,750,000. CD 7/19/57.

▲† **Ore., Corvallis**—BOMARC MISSILE FACILITIES—BA 7/9—U. S. Eng., 1519 S. Alaskan Way, Seattle 4, Wash., facilities for Bomarc IM-99B, incl. twenty-eight, 36x60 ft. rein.-con., steel launcher shelter 5,950 sq. ft. assembly and maintenance bldg., 26,490 sq. ft. composite bldg. other smaller bldgs., etc. Adair Air Force Station, ENG-45-108-59-129. Plans deposit $200. CD 5/1.

▲ **Calif., Ventura**—BA 7/28—Ventura Port Dist., 684 East Main St., Proj. No. 1, 290,000 tons rock, 800 cu. yd. concrete jetty constr., $1,500,000; Proj. No. 2, 2,600,000 cu. yd. excavation, $1,500,000. CD 4/8.

▲ **Calif., Ventura**—BERTHING FACILITIES—BA 8/4—Ventura Port Dist., 684 East Main St., Proj. No. 3 berthing facilities, 290,000 sq. ft. timber walkways 2,400 treated timber piling, $1,000,000; Proj. No. 4, grading and paving $1,000,000. CD 4/8.

BUILDINGS—BA

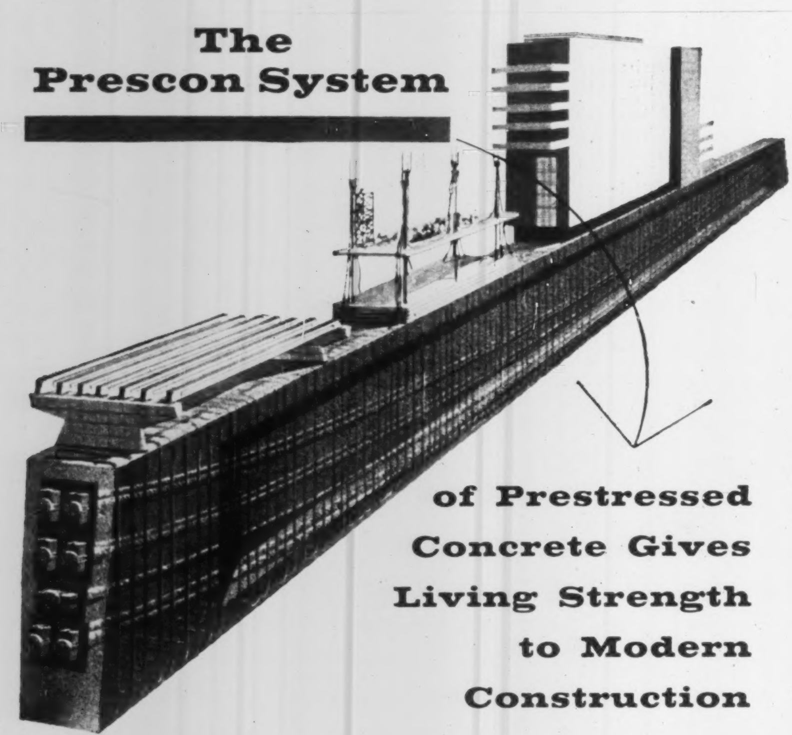
▲ **Utah, Provo**—LIBRARY—BA 6/30—Brigham Young University, Provo, 5 story 200,000 sq. ft. library $4,000,000. Plans deposit $60. Lorenzo S. Young, 455 E. 4th St., archt. CD 12/17.

▲ **Calif., San Fernando**—CAFETERIA—BA 7/8—State Div. Architecture, 1100 S. Grand Ave., Los Angeles; 49,000 sq. ft. cafeteria, San Fernando Valley State College, W.O. 4160GC-40. $1,027,000. Plans deposit $50. CD 12/12.

▲ **Calif., San Mateo**—SCHOOL—BA 7/9—San Mateo Union High School Dist., 650 N. Delaware St., 1 and partial 2 story, 165,000 sq. ft., rein.-con., steel frame, high school, Hillsborough $3,000,000. Plans deposit $40. John Lyon Reid & Partners, 1019 Market St., San Francisco, archts. CD 10/20.

BUILDINGS—SLC

Calif., Tahoe City — DINING ROOM, etc. — California Alumni Assoc., University of California, Berkeley, soon lets contract, wood frame dining room, 35 housing units, dormitory, swimming pool, near here. $430,000. Corlett & Spackman, 347 Clay St., San Francisco, archts.



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HEAVY CONSTRUCTION—LB & CA

ARIZONA—State Hy. Dpt., 206 S. 7 Ave., Phoenix.
The Ashton Co., Inc., P.O. Box 7065, Tucson, Ariz., CA **$577,865**, storm drain beginning at Salt River and extending NE for 2½ mi. just N. Buckeye Rd. in Phoenix Interstate Freeway, Maricopa Co. Bids May 29, awarded June 2. CD 5/4, under LB.

▲ **National Constr. Co.**, 153 S. 160 St., Seattle, Wash. LB **$980,440** (5 bidders), sewers in Utility Local Imprvt. Dist. No. 8, Schedules 1 and 3, BELLEVUE, WASH. Bellevue Sewer Dist., Bellevue, Wash. Bids May 29. CD 5/21;
H. Kaeser Co., 3629 34 Ave. S., Seattle, Wash., LB **$534,768** (5 bidders), Schedule 2 (Bellevue, Wash.)
F. Coluccio Constr. Co., 7778 Seward Park Ave., Seattle, Wash., LB **$441,479** (4 bidders), Schedule 4 (Bellevue, Wash.).
P. Jarvis, Inc., 1070 W. Ewing St., Seattle, Wash. LB **$360,464** (7 bidders). Schedule 5 (Bellevue Wash.).

▲ **D. Diamond Corp.**, 2839 S.W. 2 Ave., Portland, Ore. CA Est. **$2,000,000**, 1 and 2 story, 185x500 ft. rein.-con., steel frame hangar and office at Seattle-Tacoma International Airport, SEATTLE, WASH. Pacific Northern Airlines, Exch. Bldg., Seattle 4, Wash. CD 11/14/55.

† **P. S. Lord Mechanical**, 4507 S.E. Milwaukee Ave. Portland, Ore., LB **$418,304**, est. $421,631 (8 bidders), levee imprvs., left bank Columbia River, Multnomah Drainage Dist. No. 1, Multnomah Co., CIVENG-35-026-59-204, OREGON. U. S. Eng., Pittock Block Portland, Ore. Bids May 28. CD 5/7.

† **Eugene Luhr & Co.**, P. O. Box 48, Columbia, Ill., LB **$977,802**, est. $1,042,606 (8 bidders) channel imprvs. and levee constr., Cherokee Canal, Lower Butte Basin to Southern Pacific RR tracks, Butte Co. Spec. 2549, ENG-04-167-59-59, CALIFORNIA. U. S. Eng. 1209 8th St. Sacramento, Calif. Bids June 2. CD 5/26.

Griffith Co., P.O. Box 175, Station B, Bakersfield, Calif., LB **$571,987** (9 bidders), Mt. Vernon Ave. ramps from California Ave. to Lake St., 0.394 mi. BAKERSFIELD, CALIF. Bd. Supervs. Kern Co., 1100 26th St., Bakersfield, Calif. Bids May 26.

▲† **Paul Hardeman, Inc.**, 11558 Tennessee Ave., Los Angeles 64, Calif., CA **$1,868,404**, launch and service facilities, SM-65T, Missile Launch Complex, Phase 1, Vandenberg Air Force Base, ENG-04-353-59-83, LOMPOC, CALIF. U. S. Eng., 751 S. Figueroa St. Los Angeles Calif. Bids May 21. CD 5/27, under LB.

Emil R. Wohl Constr. Co., 3300 Temple St., Los Angeles, Calif., CA **$750,000**, interim jet terminal facilities and airplane parking, fueling, etc., LOS ANGELES, CALIF. United Airlines, International Airport, Los Angeles, Calif. Holmes & Narver, 823 S. Figueroa St., Los Angeles, Calif., engrs. Bids May 6. CD 4/16.

▲ **Pacific Bridge Corp.**, North Harbor, Alameda, Calif. CA **$2,462,645**, Jaybird Powerhouse, Jaybird Penstock and appurtenant works, Upper American River Proj. El Dorado Co. Inv. 2208, SACRAMENTO, CALIF. Sacramento Municipal Utility Dist., Eng. Dpt. 1708 59th St., Sacramento, Calif. Bids May 28, awarded June 4. CD 6/2, under LB.

BUILDINGS—LB & CA

† **Fischbach & Moore**, 3201 Fremont Ave., Seattle 3, Wash., LB **$495,000**, est. $375,000 (14 bidders), install and check out instrumentation for FLIGHT ENGINE TEST FACILITY at National Reactor Testing Station, Inv. AT (10-1)-007, ARCO, IDAHO. Atomic Energy Comm., Idaho Operations Office, Idaho Falls, Idaho. Bids June 2. CD 4/29.

▲ **Berry Constr. Co.**, 660 W. 6th St., Ontario, Calif., LB **$1,067,000**, concrete, masonry Vincent and Mesa SCHOOLS (15 bldgs.), COVINA, CALIF. Covina School Dist., 19009 E. Badillo St., Covina, Calif. Bids June 4. CD 5/26.

▲ **Lindgren & Swinerton, Inc.**, 1631 Beverly Blvd., Los Angeles, Calif., CA 162,000 sq. ft. PLANT for research and mfg. computers and controls, DOWNEY, CALIF. Autonetics Div. North American Aviation, Inc., 9150 E. Imperial Hy., Downey, Calif. Bechtel Corp., 4620 Seville Ave., Los Angeles, Calif., archts.-engrs.

▲ **Lee Co., Inc.**, 401 S. Rossmore Ave., Los Angeles, Calif., CA **$5,465,000**, 22 story, metal OFFICE, 5455 Wilshire Blvd., LOS ANGELES, CALIF. Lee Tower, Inc., 401 S. Rossmore Ave., Los Angeles, Calif. Brandow & Johnson, 2430 W. 3rd St., Los Angeles Calif., engrs.

▲ **Bollenbacker & Kelton**, 5447 El Cajon Blvd., San Diego, Calif., Owner Builds, **$1,200,000**, 127 frame stucco DWELLINGS, Walbollen St., Folkestone St., SPRING VALLEY, CALIF.

Southwood Constr. Co., 2918 W. Compton Blvd., Gardena, Calif., Owner Builds, **$571,150**, 39 frame stucco DWELLINGS, Tract 22228, TORRANCE, CALIF.

Oltmans Constr. Co., 516 S. Monterey Pass Rd., Monterey Park, Calif., CA **$530,000**. SHOPPING CENTER 21720-40 Hawthorne Ave., TORRANCE, CALIF. Del Amo Estates Co., 325 W. 8th St., Los Angeles, Calif.

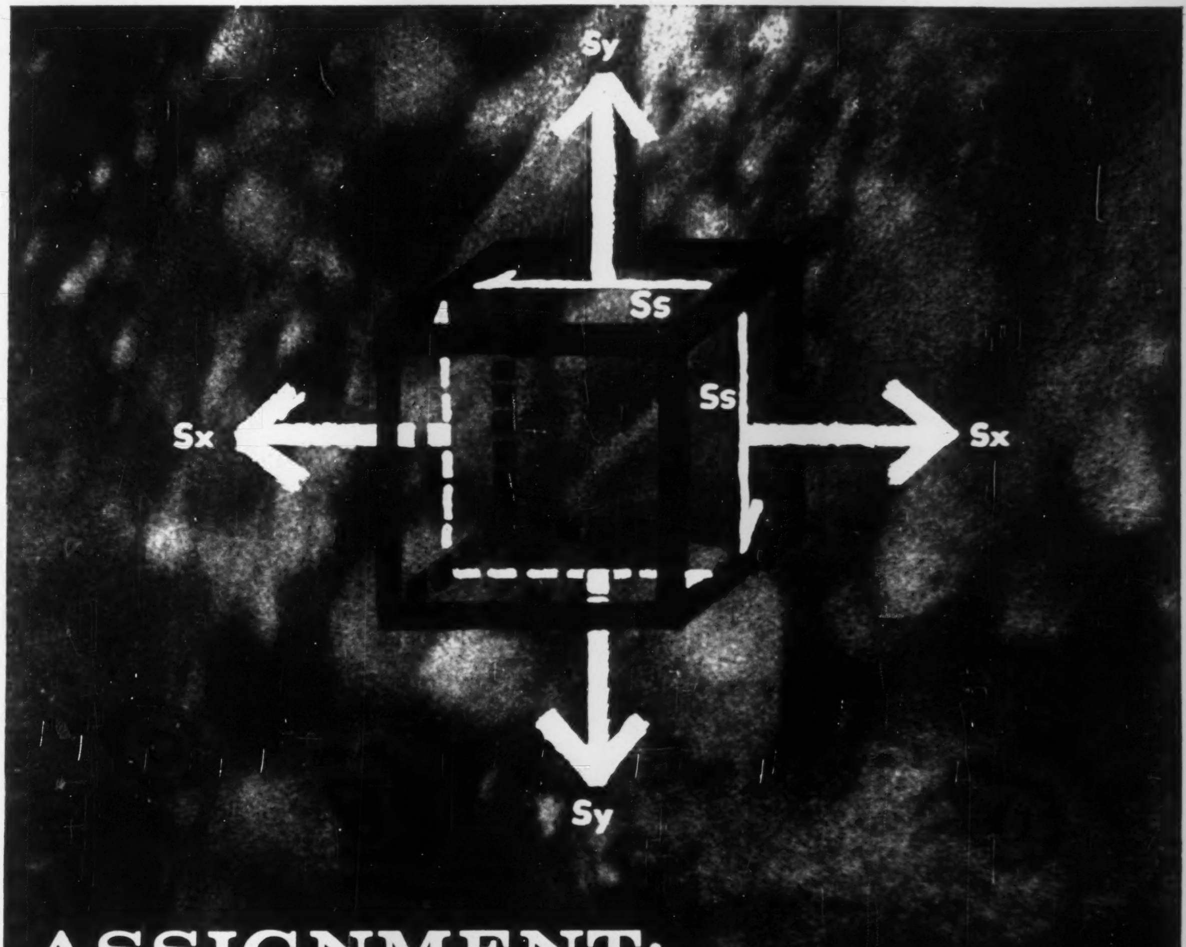
CANADA

BUILDINGS—BA

▲ **Ont., Hamilton**—SCHOOL—BA 6/24—Bd. Educ., 357 Hunter St. W., concrete, structural steel frame, brick, concrete block high school, Mohawk Rd. $1,500,000. Plans deposit $50. Prack & Prack, 310 Main St. E., archts. CD 3/3.

Que., Jacques-Cartier—SCHOOL—BA 6/30—Catholic School Comm., Cite de Jacques-Cartier, 1877 Brebeuf St., school, Dubuc St. $400,000.

(Continued on page 240)



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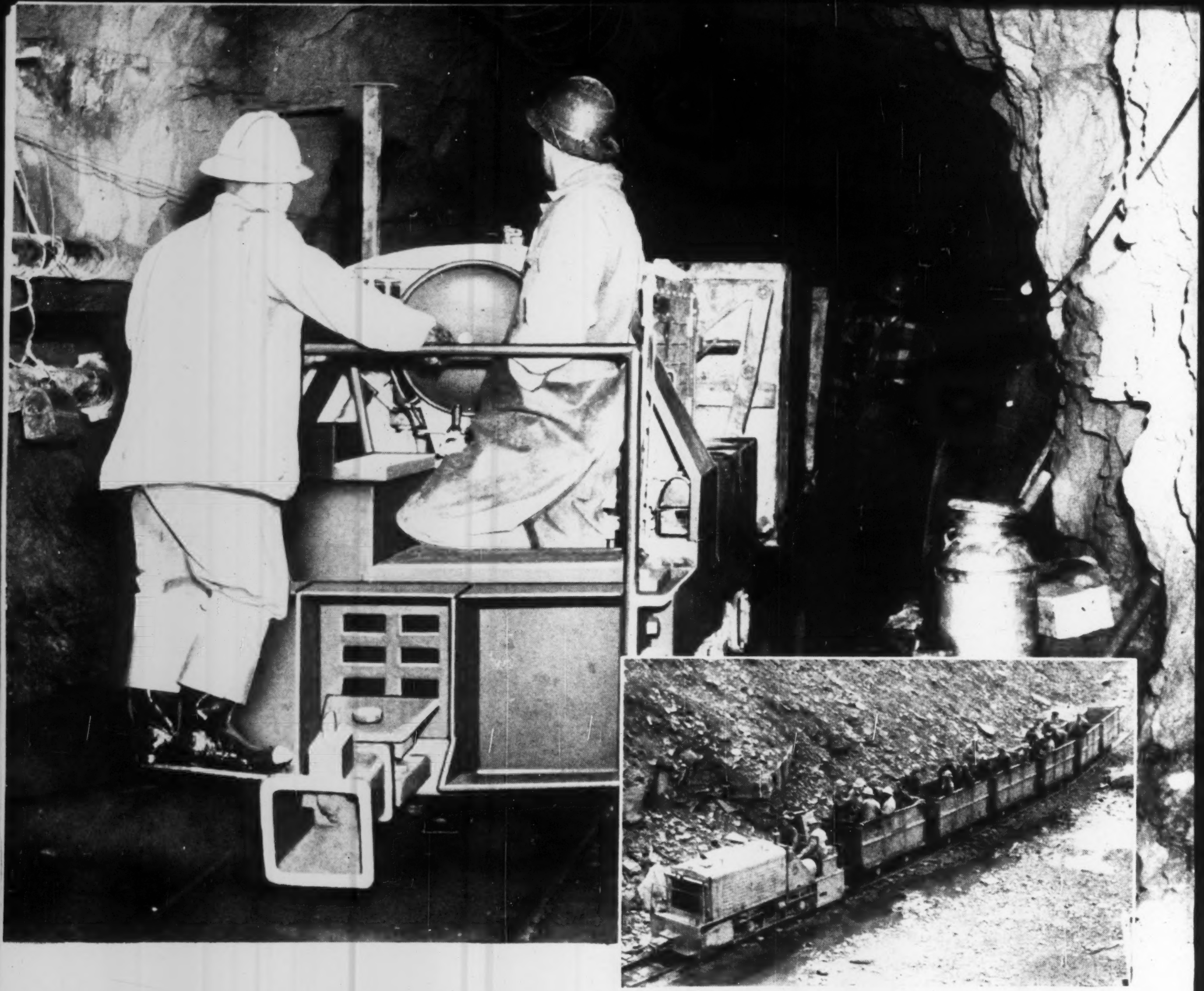

PLYMOUTH Mine-O-Motives help set new records at West Delaware Tunnel

A fleet of 17 Plymouth Mine-O-Motives, employed by joint venture contractors Drake-Grafe-Winston-Tecon-Conduit under Project Manager Clancey O'Dell, have helped to establish new hard-rock tunneling records of as high as 85 feet per day on the West Delaware Tunnel near Cannonsville, New York. Working around the clock since the summer of 1956, these Diesel-powered mine locomotives have seen the most rugged service imaginable for mechanical equipment. Rough trackage, deep water, heavy loads of rock waste, all on a 24 hour schedule to push this 45 mile long tunnel deep through the Catskills for additional water to the New York City water system.

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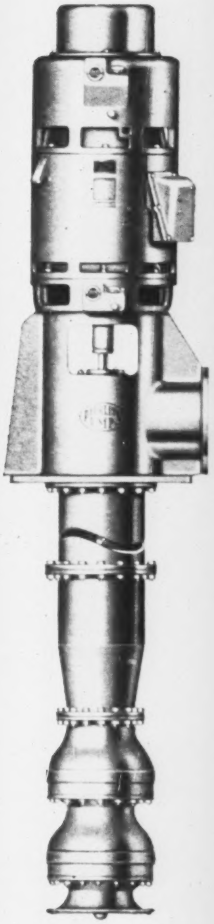

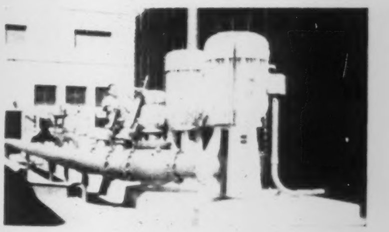

mark of distinction

As the Northwest Indians told their story with totem poles, Peerless Pump dramatizes theirs in terms of outstanding performance. An example is the Peerless vertical industrial service pump. Versatile and economical, these pumps offer excellent head-capacity characteristics, plus other measurable advantages such as: *advanced vertical turbine design* for peak efficiency, *designed-in flexibility* for adaptation to future system requirements, *vertical pump-motor design* for maximum utilization of floor space. Available in water and process liquid handling types, the Peerless vertical industrial service pump can be applied to all installations where liquids are to be transferred from short settings.

WRITE FOR BULLETIN NO. B-505

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Putting Ideas to Work

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Peerless Pump Division

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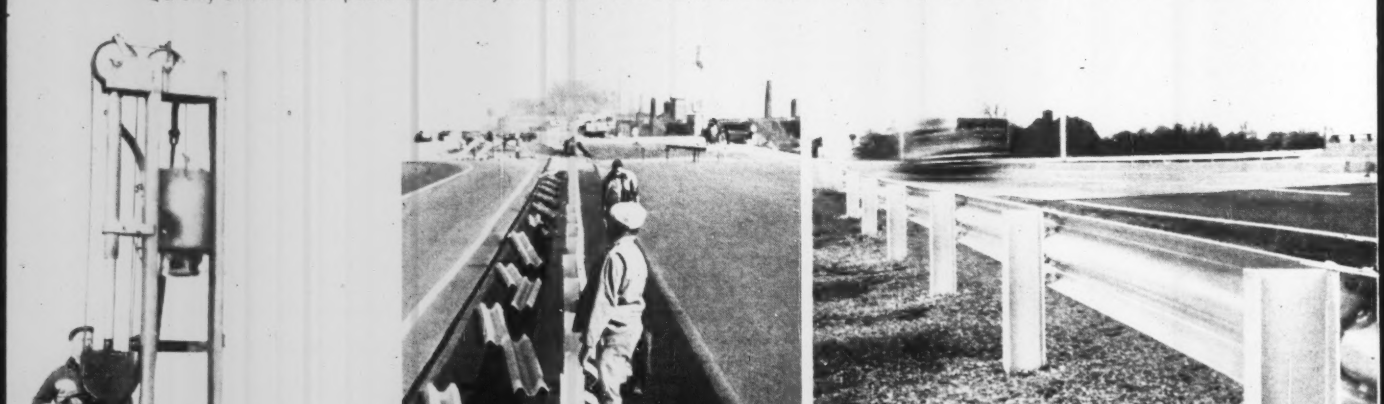
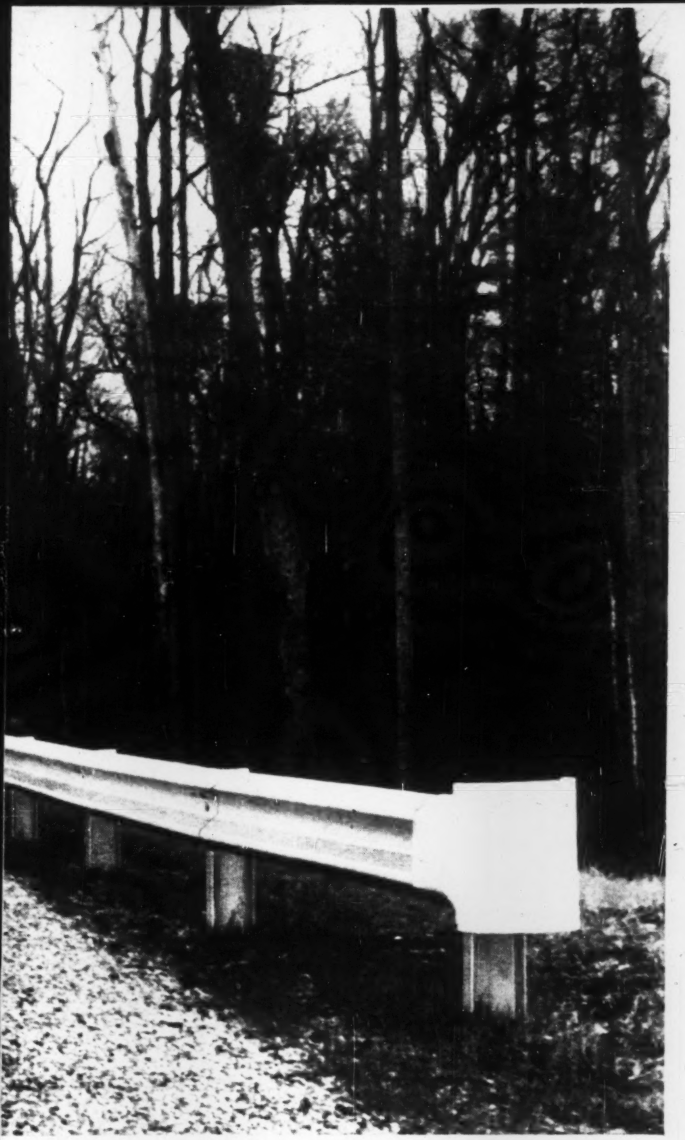
Offices: New York; Cleveland; Chicago; St. Louis; San Francisco; Atlanta; Plainview; Lubbock; Phoenix; Albuquerque; Los Angeles; Fresno. **Distributors in Principal Cities.** Consult your telephone directory.

Quickly driven steel posts and easily attached steel beams produce a strong, highly visible and economical guard rail.





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(USS) AmBridge Highway

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Rugged, flexible, highly visible steel beam guard rail firmly bolted to sturdy steel posts is the strongest, surest traffic safeguard available. And economical too, since the posts are readily driven and the guard rail is easily spliced and installed.

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1. *All* mill scale is removed before the guard rail section is formed, assuring uniform, tenacious paint adherence.

2. Prior to painting, all sections are degreased, given two hot water rinses, and oven dried. Then a coat of rust-inhibiting shop primer is applied.

3. USS AmBridge Beam Guard Rail can be furnished in 25′ lengths, cutting splicing requirements in half and appreciably reducing bolt costs.

For more information, get in touch with any of the offices listed below.

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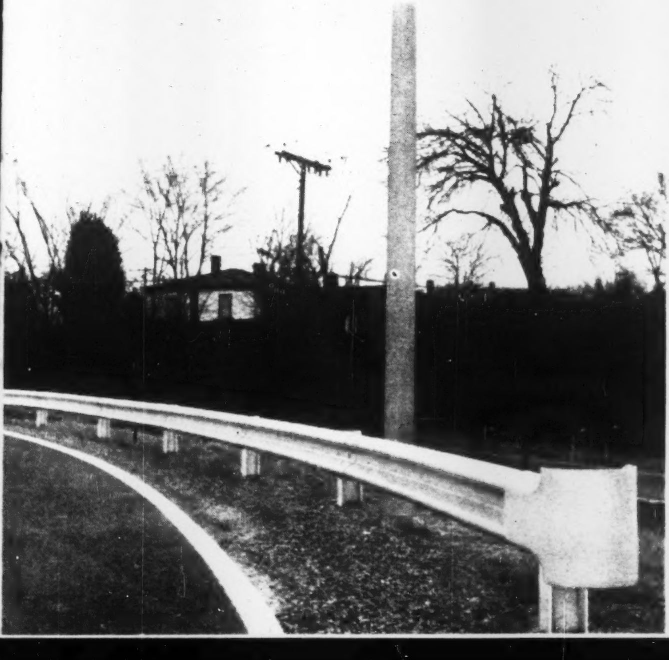

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(Continued from page 234)

BUILDINGS—LB & CA

Arlington Builders Ltd., 875 Madison Ave., Winnipeg, Man., CA Est. $750,000 (11 bidders), SCHOOL, Windsor Park Collegiate, ST. BONIFACE, MAN. School Dist. of St. Boniface No. 1188, St. Boniface, Man. Bids Apr. 2, awarded May 28. CD 3/2[illegible].

▲ **Yukon Constr. Co Ltd.**, 10105 108 Ave., Edmonton, Alta., LB $1,924,316 (9 bidders), construction and erection various BLDGS. and related work, Cambridge Bay, NORTH WEST TERRITORIES. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.

Curran & Herridge Constr. Co. Ltd., 281 Confederation St., Sarnia, Ont., CA $750,000 (9 bidders), 1 and partly 3 story, structural steel frame, masonry walls, concrete fdn., U-shaped HIGH SCHOOL, GYM. and ADMIN. BLDG., CHATHAM, ONT. Ursuline Convent, 85 Grand Ave. W., Chatham, Ont. Bids May 27. CD 5/8.

▲ **Campeau Constr. Co., Ltd.**, 525 Bank St., Ottawa, Ont. Owner Builds, $2,500,000, SHOPPING CENTER, Smyth Road and St. Laurent Blvd., OTTAWA, ONT.

Acme Building & Constr. Ltd., 289 Cedar St., Sudbury, Ont., $625,000, 5 story, 99 x 120 ft. structural steel frame, brick STORE and OFFICE, Durham St., SUDBURY, ONT. Northern Rent & Interest Corp., 289 Cedar St., Sudbury, Ont. Lewis, [illegible] & Co., Ltd., 127 Pine St., Sudbury, Ont., engrs.

▲ **Hull Syndicate**, c/o Henri Laflamme, 400 Alexander Taché, Hull, Que., Owner Builds, $2,000,000, SHOPPING CENTER, St. Joseph and Gamelin Blvds., HULL, QUE.

Construction Mont-Royal Ltee., [illegible] Jean Talon St. E., Montreal, Que., CA $400,000, SCHOOL, St. Joseph de Bordeaux, corner Pasteur and Victor-Dore Sts., MONTREAL, QUE. Montreal Catholic School Comm., 3737 Sherbrooke St. E., Montreal, Que. Awarded May 26. CD 1/2.

Louis Donolo Inc., 8320 St. Lawrence Blvd., Montreal, Que., CA $750,000 concrete, steel, brick PHARMACEUTICAL PLANT extension, MONTREAL, QUE. Ayerst, McKenna & Harrison Ltd., 1025 Laurentian Blvd., Montreal, Que. CD 4/23.

PROPOSED PROJECTS

WATER SUPPLY

Ariz., Chandler—City, City Hall, WW imprvs., $400,000.

▲ **Colo., Boulder**—City, City Hall, $1,800,000 bond election July 21, WW sys. expansion and transmission line into N. Boulder Canyon. CD 1/29.

Conn., Manchester—Manchester Water Co., 346 N. Main St., filter plant, Wilson Brook, Bolton, $441,000. Henry Souther Engineering Corp., 11 Laurel St., Hartford, consult. engrs.

▲ **Hawaii, Honolulu**—Hawaii Water Auth., Territorial Office Bldg., 20 in. pipe line along the Mamalahoa Highway, $2,400,000; 6,000 ft. pipe line connecting Kahaluu Well to existing Kailua-Keauhou water line, $100,000. L. H. Herschler, P. O. Box 373, Zone 9, engr.

Ill., Paris—City, City Hall, voted $510,000 bonds May 19, third water supply lake (reservoir). Alvord, Burdick & Howson, 20 N. Wacker Dr., Chicago, consult. engrs. CD 10/8.

N. Y., Buffalo—City Water Dpt., City Hall, East Delevan water main extension, $575,000.

▲ **N. Y., Elma**—Town, Town Hall, public water sys., $3,250,000. John Rutherford Campbell, Dunn Bldg., Buffalo, consult. engrs. CD 3/13.

SEWERS, WASTE DISPOSAL

Ariz., Chandler, City, City Hall, sewerage imprvs., $500,000.

▲ **Calif., Carlsbad**—City, 2960 Pio Pico Dr., bond election July 28, sewer imprvs., $1,200,000; storm drain imprvs., $155,000.

Conn., Greenwich—Town, Town Hall, incinerator, $500,000. William Rauch, 61 Hilton Ave., Garden City, N. Y., consult. engr. CD 5/14.

▲ **Ill., Dixon**—City, City Hall, sewage bypass plant north Rock River, secondary treatment south side of river and storm and sanitary sewers, $1,000,000. [illegible] R. Wallett, 117 N. Galena Ave., consult. engr.

Md., LaVale—Sanitary Comm., Lavale, sanitary sewers, $600,000.

N. J., Trenton—Ewing-Lawrence Sewer Auth., [illegible] Whitehead Rd., sewer line extens. over right of way on Franklin Corner Rd. to Lawrenceville, $700,000. Buck, Seifert & Jost, 112 E. 19 St., New York, N. Y., consult. engrs.

N. Y., Bolton Landing—Town, sewerage sys., treatment plant, $700,000. Morrell Vrooman, Gloversville, consult. engr. CD 4/9/56, under N. Y., Bolton.

O., University Heights—City, City Hall, sewers in Edgerton Rd. Sewer Dist., $800,000. Frank L. Woodruff, 3482 Lee Rd., Cleveland, Zone 20, O., engr. CD 11/21/49.

Pa., West Grove—Boro, Boro Hall, Box 61, sanitary sewerage sys. and sewage plant, $525,000. Chester Valley Engineers, Inc., 159 W. Lancaster Ave., Paoli, and [illegible] Sanitary Engineering Co., 1100 S. Broad St., Trenton, N. J., consult. engrs. CD 6/2/58.

W. Va., Hinton—City, City Hall, interceptor sewer and primary-type sewage treatment plant, Proj. No. W. Va. 46-P-3026, $562,106.

BRIDGES

▲ **BRITISH COLUMBIA**—Govt. British Columbia, Parliament Bldgs., Victoria.

Kamloops—1,000 ft., 5-span, continuous riveted plate girders, four lane bridge over Thompson River, rein. con. shore approaches, Thompson River, $3,000,000. Phillips, Barratt & Partners, 2090 W. 4 St., Vancouver, consult. engrs. archts.

STREETS AND ROADS

Mo., University City (St. Louis 5 P.O.)—City, City Hall, 6801 Delmar Blvd., Zone 5, defeated $485,000 bonds May 26, street imprvs. CD 4/8.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1,

Franklin Co.—reconstr. 8.8 mi. Rte. 95 from intersection with Rte. 11 in Moira northward thru Bombay to Pikes Creek Bridge, FAI Project, $1,000,000.

▲ **Tex., Victoria**—City, City Hall, bond election June 30, asphalt and permanent type street paving, $1,500,000; repairing and reworking streets, $500,000; gravel and macadam streets, $250,000. CD 2/18.

▲ **Va., Lynchburg**—City, City Hall, 4 lane Riverside expressway, inc. bridge, underpass, drainage, $1,195,000.

EARTHWORK, WATERWAYS

▲ **Tex., Galveston**—Galveston County, Courthouse, Galveston Sea Wall, $2,500,000; continuation of sea wall at Texas City, near here, $1,500,000.

AIRPORTS

▲+ **Fla., Cocoa**—MISSILE ASSEMBLY BLDG.—[illegible] Eng., 575 Riverside Ave., Jacksonville, guided missile assembly bldg., test and launching facilities, Patrick Air Force Base, $14,900,000, allotted [illegible]

▲ **Hawaii, Honolulu**—AIRPORT IMPRVS.—Hawaii Aeronautics Comm., Honolulu International Airport, plans by Terr. Hwy. & P. Wks., Territorial Office Bldg.; Phase 2, drainage and utilities, access road to Inter-Island area, $400,000; Bids in June. Phase 3, Inter-Island Terminal and Foreign arrival section, $990,000; Bids in July. Phase 4, basic utilities and

(Continued on page 243)

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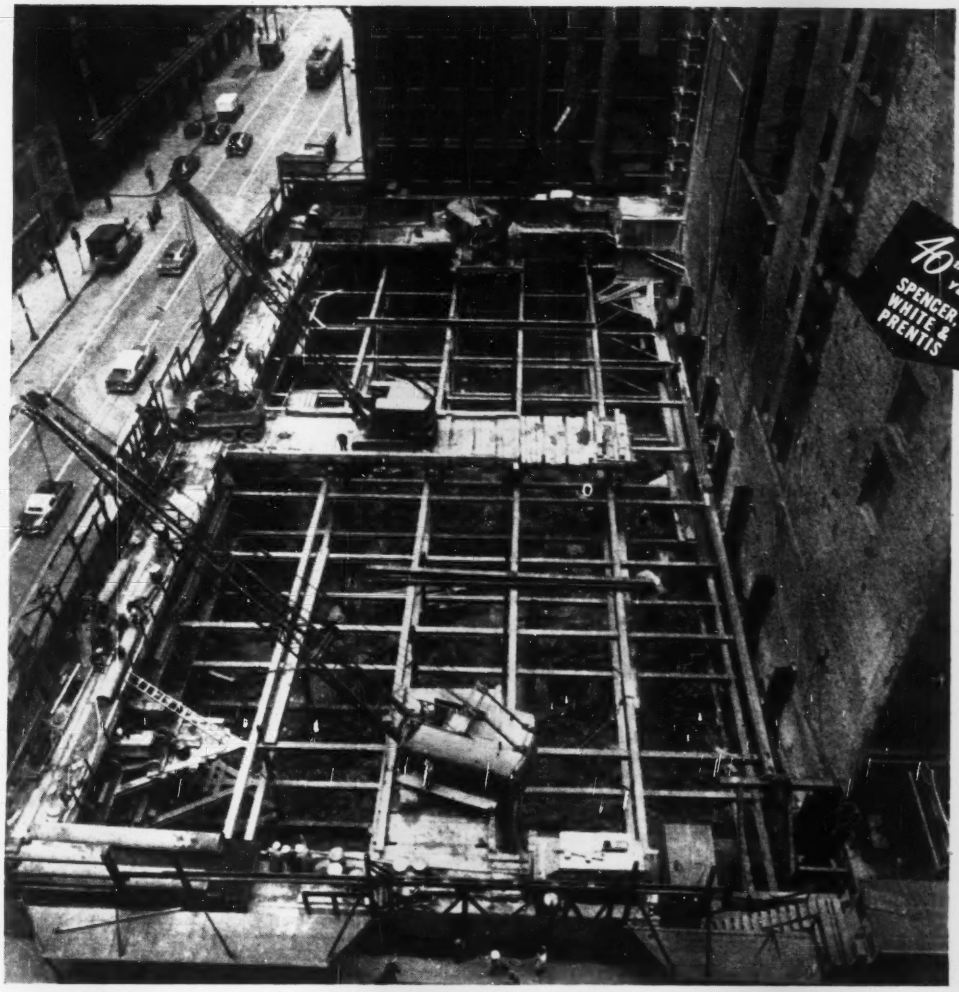

Owner: Harris Trust and Savings Bank, Chicago, Ill.

Architects & Engineers: Skidmore, Owings & Merrill, Chicago, Ill.

General Contractors: Turner Construction Company.

FOUNDATION FOR CHICAGO SKYSCRAPER

Drilled-In Caissons carry load to rock without loss of ground

This foundation—for Harris Trust and Savings Bank's new 23-story addition—illustrates the special features of the Drilled-In Caisson method, used here for the first time for a large downtown Chicago building.

On a site surrounded by existing structures, Drilled-In Caissons were installed through lenses of running sand and seated in bedrock at a 111-ft. depth—without disturbance of the foundations of adjacent buildings.

The sheeting and bracing system, pictured above, is similar to the one we had previously installed for the foundation of the nearby Inland Steel Building.

There was no division of responsibility on this project. Spencer, White & Prentis did the excavation, sheeting, bracing and caissons under one contract. Despite a tight schedule set by the General Contractor, the work was completed on time.

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Capitol Architect, J. George Stewart
Mechanical Contractor, Lloyd E. Mitchell, Inc., Baltimore
Consulting Engineer, Guy B. Paneno, New York

Photo by Henry Rohlund,
Staff Photographer,
Washington Post & Times Herald

RIC·WIL

underground piping...

..."GOES TO WASHINGTON!"

The photograph shows the dismantling of the east front of the Capitol Building. The extension of the Capitol Building will be completed in 1960 and some 32 feet will be added to the over-all structure. The photograph also shows a section of new Ric-wil pipe (foreground) that will handle the steam service.

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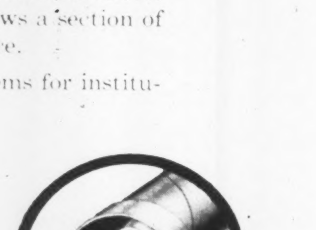

(Continued from page 240)

[illegible] and domestic service units, connecting walkways, $4,000,000. Bids in June. CD 1-28-52.

▲+ Md., Andrews Air Force Base—AIRMEN'S DORMITORIES, etc.—U. S. Eng., First and Douglas Sts. N. W., Wash., D. C., plans by Clark, Buhr & Nexsen, Midtown Bldg., Norfolk, Va., airmen's dormitories and officers quarters, $1,000,000-$5,000,000; plans by Willgoos, Straubel, Pinero & Koeckle (joint venture) 1145 19th St., N. W., Wash., D. C., commissary storage and jet test cell, $100,000-$500,000, utilities $1,000,000-$5,000,000, operations training and engineering administration, $1,000,000-$5,000,000, supply facilities $500,000-$1,000,000, aircraft maintenance facilities $1,000,000-$5,000,000; plans by Whitman Requardt, 1304 St. Paul St., Baltimore, Md., aircraft apron and washrack, $1,000,000-$5,000,000, all at Towers Field., CD 9-9.

▲+ Md., Andrews Air Force Base—HANGAR, etc.—U. S. Eng., First and Douglas Sts. N. W., Wash., D. C., hangar, $1,000,000-$5,000,000, three hangars and washrack, Over $5,000,000, Green Assoc. Inc., 220 E. Pleasant, Baltimore, Md., consult. engrs.; plans by Walton & Madden, 3510 Rhode Island Ave., Mt. Rainier, Md., base operations and terminal bldg. $1,000,000-$5,000,000, warehouse, base supply, Under $50,000; plans by McLeod & Ferrar, 1200 18th St., N. W., Wash., D. C., NCO open mess, $500,000-$1,000,000; plans by Whitman Requardt, 1304 St. Paul St., Baltimore, Md., taxiway, warmup pads; instrument landing sys. and approach lighting $1,000,000-$5,000,000, sewage disposal plant, $50,000-$100,000, base communications bldg., $50,000-$100,000. CD 9-9.

PUBLIC BUILDINGS

+ Ala., Fort McClellan—HOSPITAL—U. S. Eng., 2301 Grant St., Mobile, station hospital; Warren, Knight & Davis, Protective Life Bldg., Birmingham, consult. engrs.-archts. CD 9-5-58.

▲ Ark., Marked Tree—DWELLINGS—Housing Auth., plans by Stanley, Brown & Assocs., 4012 Cedar Springs Rd., Dallas, Tex., 100 dwelling units, $1,000,000.

▲ Ark., West Memphis—DWELLINGS—Housing Auth., dwelling units, Ark. 24-150, $1,500,000.

Calif., Dixon—SCHOOL—Dixon Unif. School Dist., plans by Corlett & Spackman, 347 Clay St., San Francisco, 11,000 sq. ft. steel, concrete Dixon High School and Dixon Elementary School Addn. $600,000.

Calif., San Jose—JUVENILE GIRLS HOME—Bd. Supervs., Santa Clara Co., 1st and Rosa Sts., plans by Kuremsky-Perske, 1153 Lincoln Ave., 18,000 sq. ft. concrete block, built up roof Juvenile Girls Home, $562,250.

Colo., Montrose—SCHOOL—School Dist. No. 1, South Cascade Ave. and S. 3 St., voted $700,000 bonds May 26, 54,000 sq. ft. Junior High School. CD 5-21.

▲ Colo., Pueblo—SCHOOL—School Dist. 60, plans by Kenneth Stades, 222 S. Victoria Ave., Junior High School, $1,605,000. Bids in July. CD 8-28.

Conn., Stamford—SCHOOL—Town, Bd. Educ., 151 Broad St., plans by Sherwood, Mills & Smith, 65 Broad St., Rogers School addn., Williams St., $400,000. CD 4-15.

▲ Fla., Tallahassee—HOUSING—Florida State Bd. Control, State University, plans by Guy C. Fulton, Bldg. "E", University of Florida, Gainesville, sixteen 2 story, 38 x 154 ft., one 1 story, 40 x 79 ft., one 1 story, 26 x 82 ft., concrete, brick, college housing, incl. water, sewers, elec., $2,000,000. Bids soon.

▲ Ga., Atlanta—HOUSING—Housing Auth. City, Transit Co. of Georgia Bldg., plans by Willner & Millkey, 761 Peachtree St., N. E. and Finch, Alexander, Barnes, Rothschild & Paschal, 70 Fairlie St., N. W., relocation 350 units housing, GA 6-11, $3,000,000-$4,000,000; plans by Stevens & Wilkinson, 157 Luckie St., N. W. and Bodin & Lamberson, 827 Forsyth Bldg., relocation 150 units housing, GA 6-12, $6,000,000-$7,000,000.

Ga., Perry—SCHOOL—Houston Co. Bd. Educ., Perry, White High School, $750,000.

▲ Ill., Champaign—SCHOOL—Bd. Educ., plans by Thomas Berger, 44 Main St., 1 story Junior High School, southwestern section, $1,200,000.

▲+ Ill., Chicago—FEDERAL COURT HOUSE, etc.—General Services Admin., 18th and F Sts. N. W., Wash., D. C., plans by Schmidt, Garden & Erikson, 104 S. Michigan Ave., Mies van der Rohe, 230 E. Ohio St., Naess & Murphy, 224 S. Michigan Ave., and A. Epstein & Sons, Inc., 2011 W. Pershing St., federal court house and office, $38,500,000, and 2nd federal office $44,500,000, Dearborn, Jackson and Adams Sts. CD 1-23.

Ill., Petersburg—SCHOOL—School Dist. No. 201, high school, $900,000.

▲ Iowa, Burlington—SCHOOL—Independent School Dist., Bd. Educ., defeated $3,250,000 bonds May 11, elementary school, Junior High School addn., Oak St. Junior High and other schools. CD 4-15.

Ky., Barbourville—HOUSING—City Housing Comm., plans by James Allen Clark, Brown-Proctor Hotel, Winchester, 80 unit low-rent housing, $800,000.

Ky., Covington—JAIL—City, City Hall, plans by Betz & Bankemper, Scott St., jail, $400,000.

Ky., Richmond—DORMITORY, etc.—Commonwealth of Ky., Div. Purchases, Frankfort, plans by Meriwether, Marye & Assoc., 248 East Short St., Lexington, women's dormitory for Eastern State College, $600,000. CD 12-29; plans by James Allen Clark, Brown-Proctor Hotel, Winchester, Ky., housing for married students, Over $[illegible]; M. R. Holladay, [illegible] Main [illegible] Dr., Lexington, consult. engr. CD 11-10.

La., Jennings—SCHOOL—[illegible] plans by [illegible] & [illegible], [illegible] Alexandria, [illegible] $750,000.

(Continued on page 246)

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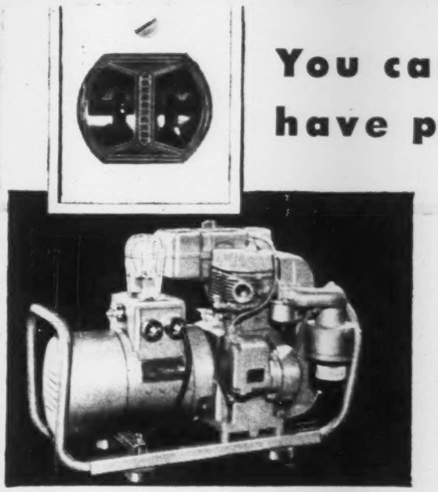

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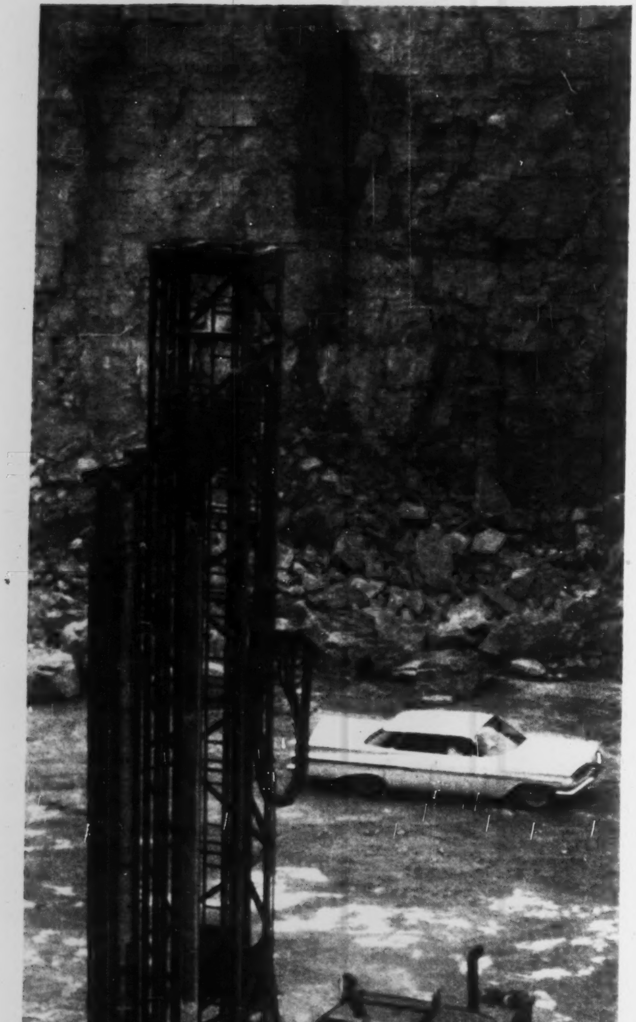

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REICHdrill T-850 Heavy, mounted on a large, off-highway truck. This Model is designed to drill 10⅝" blastholes in extremely hard formations. It is turbo-charged for high altitude service.

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designed WITH CONCRETE IN MIND

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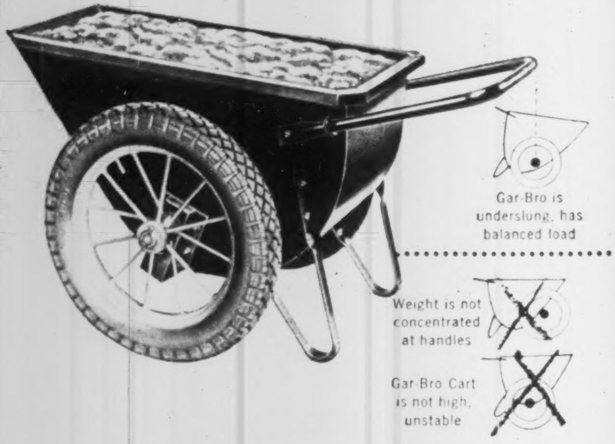
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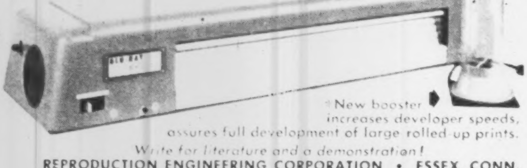

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BLU-RAY

CIRCLE G-1 READER SERVICE CARD

(Continued from page 243)

† Md., Fort Detrick—ANIMAL BREEDING BLDGS—U. S. Eng., First and Douglas Sts. N.W., Wash. D. C., plans by Turpin Wachter & Assoc., N. Capitol St. and Massachusetts Ave., Wash., D. C. four animal breeding bldgs. $100,000-$500,000. CD 3/29/56.

† Md., Fort Detrick—BARRACKS, etc.—U. S. Eng., First and Douglas, Sts. N.W., Wash., D. C., plans by McGaughan & Johnson Assoc., 2000 P St. N.W., Wash., D. C. barracks w/ mess. $100,000-$500,000.

▲† Md., Fort Ritchie—COMMUNICATION FACILITIES—U. S. Eng., First and Douglas Sts. N.W., Wash., D. C. communication facilities. Over $5,000,000. CD 10/13/52.

Mass., Agawam—HOUSING for the ELDERLY—Town Housing Auth., 775 Springfield St., housing for the elderly. $400,000. Constr. 1959-1960.

Mass., Danvers—SCHOOL—Town Supt. Schools, Pickering St., plans by Rich & Tucker Assoc., 45 Newbury St., Boston. Great Oak Elementary School addn. $400,000. Constr. 1959.

Minn., Le Center—SCHOOLS—School Dist. No. 392 LeSueur Co., voted $675,000 bonds May 26, schools. Voigt & Fourre, 1337 St. Clair Ave., St. Paul, archts.

▲ Miss., Cleveland—HOSPITAL—Bd. Supervs. Bolivar Co., plans by Brewer, Skewes & Godbold, Architects-Engineers, [illegible] Clarksdale, 3 story, 100-bed brick, concrete, steel, etc., East Bolivar County Hospital. $1,300,000. Bids Feb. 1960. CD [illegible]

Miss., Port Gibson—PLANT—Bd. Supervs. Claiborne Co., voted bonds May 26, plant. $800,000. [illegible]

▲ Mo., Charleston—HOUSING—City Housing Auth., [illegible] plans by [illegible] Smith & Assocs., P. O. Box [illegible], Paducah, Ky., [illegible] 100 dwelling units. $1,000,000.

Mo., Chillicothe—SCHOOL—Chillicothe R-2 School Dist., voted $550,000 bonds May 26, Junior High School addn. [illegible] & [illegible] Kansas City, Mo., archts. CD 5/7.

Mo., Columbia—VETERINARY CLINIC—Curators of University of Missouri, 116 Jesse Hall, plans by Gentry & Voskamp, 4 W. 13th St., Kansas City, Mo., 2 story, 39,000 sq. ft. 204 x 270 ft. brick [illegible] veterinary [illegible] Over $400,000. CD 2/1/56.

▲ Mo., Ferguson (St. Louis 21 P.O.)—SCHOOL—Ferguson-Florissant School Dist. R-2, Bd. Educ., 655 January Ave., Zone 21, $1,500,000 bond election June 2, Junior High School, new, [illegible] Parker Rd., Florissant. CD 1/28/58.

Mo., Huntsville—SCHOOL—Westran School Dist., Randolph Co., defeated $550,000 bonds May 5, Junior-Senior High School, south of here. CD 4/27.

▲ Mo., Moberly—HOUSING—City Housing Auth., plans by Ast & Cravinger, Box 418, 150 unit housing. $1,800,000.

Mo., Rolla—CLASSROOM, etc.—Curators University of Missouri, 116 Jesse Hall, Columbia, plans by P. John Hoener & Assocs., 4227 Watson Rd., St. Louis, Zone 9, 4 story classroom, $750,000; atomic power reactor and equipment, $100,000, for School of Mines & Metallurgy. CD 2/1/56.

▲ N. J., Trenton—SCHOOLS—Bd. Educ. Twp. of Hamilton, voted bonds May 26, Junior High School, Yardville-White Horse Rd., $2,000,000; Junior High School, Yardville-Hamilton Square Rd., $2,200,000. Kramer, Hirsch & Carchidi, 115 W. State St., archts. CD 3/24.

▲ N. M., Albuquerque—SCHOOL—Albuquerque Municipal School Dist., plans by Ferguson, Stephens & Assocs., 415 Amherst Dr. S.E., Northeast Heights High School, N. M. 60-C-2A-10. $1,000,000. CD 4/15/58.

N. Y., Brooklyn—PRECINCT STATION HOUSE—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by George J. [illegible], 447 E. 52nd St., New York, Zone 22, Proj. PO-43, 76th Precinct Station House for Police Department. $634,000. Weinberger, Frieman, Leichtman & Quinn, 20 Vesey St., New York, Zone 7, structural engrs.; Robert Levy & Assoc., 500 Fifth Ave., New York, Zone [illegible] mechanical engrs. CD 8/13.

▲ N. Y., Herricks—SCHOOL—Bd. Educ., bond election June 3, 18 classroom high school addn. $2,250,000.

▲ N. Y., New Dorp—PRECINCT STATION HOUSE, etc.—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by [illegible] & [illegible], [illegible] Central Ave., Staten Island 1, N. Y., Proj. PO-38, 122nd Precinct Station House and garage, Hylan Blvd., Bryant Ave. [illegible] Garden [illegible], Police Department. $1,234,000. [illegible] & Van [illegible], 150 Liberty St., New York, Zone 6, structural engrs.; Mazzola & [illegible], 232 E. 44th St., New York, Zone 17, mechanical engrs. To go ahead [illegible] CD 12/12/5[illegible]

▲† N. D., Bismarck—POST OFFICE, etc.—General Services Admin., 19th and F Sts. N.W., Wash., D. C., plans by [illegible] & Askew, Bismarck, Post Office and Court House. $3,565,000. [illegible] appropriation.

▲ O., Newark—SCHOOLS—Heath [illegible] voted bonds May 26, schools. $1,920,000. [illegible]

O., New [illegible]—Bd. Educ. Central District, Sherwood [illegible] Nov. 4, school. $980,000.

O., Parma—SCHOOLS—Bd. Educ., 5401 W. 54th St., Cleveland Zone 29, plans by John [illegible], The Arcade, Cleveland, Zone 14, elementary school, Pleasant Valley, Broadview Rd. Area. $450,000. CD 11/9/56.

Tex., Coahoma—SCHOOL—Coahoma Ind. School Dist., school. $695,000.

Tex., Dallas—SHOP—Dallas County, [illegible] Courthouse, plans by [illegible] & Assocs., [illegible] Bldg., [illegible] shop between [illegible] and Mesquite. $125,000.

(Continued on page 250)

CIRCLE G-6 READER SERVICE CARD →

600 hp Michigan replaces tandem-pushers on Hugh Steele Inc. highway job

Earns $126 extra per hour

"Earning their keep!?! Why, in a year, I could run them into the middle of the Chattahoochee River, and still walk away with a profit!"

Hugh Steele is talking about three rubber-tired Michigan Dozers that are making their mark in big, bold dollar signs all around his 18.1 mile highway contract near Ashburn, Georgia.

Biggest profit producer is in the cut. It's a *600 hp* Michigan Model 480! This big rig started out in demonstration against two 190-hp crawlers push-loading in tandem. The results were so one-sided Mr. Steele wouldn't let Atlanta distributor Stith Equipment Co. take the Michigan off his job.

Scales, stop watch tell the story: 14 more loads per hour

With scales and stop watches, this production story was recorded:

	Model 480	Tandem Crawlers
Material	Sandy clay (3000 lbs/yd)	Sandy clay (3000 lbs/yd)
Scraper capacity (each of 12 machines)	25 yds heaped	25 yds heaped
Average load time	30 seconds	44 seconds
Pusher cycle time	60 seconds	84 seconds
Average payload, scale weighed	60,000 lbs	48,600 lbs
Average pay yds	20.0	16.2
Scraper loads per 50-min hr.	50.0	35.7
Scraper output per 50-min hr.	1,000.0 yds	578.3 yds

In terms of cold cash, these figures mean simply that the Michigan *earns more dollars per hour*. A lot more! In 30c dirt, its *extra earnings* average *$126 per hour* over tandem pushers, according to Mr. Steele.

Faster pushing nets bigger pay loads

Watch a few push-loading cycles and you'll see why. The Model 480 has half again as much power as the two crawler-pushers *combined*. It backs up faster than crawlers, and being one machine instead of two, naturally positions faster (24 seconds faster, on the average, on this job). It pushes faster (at speeds up to 5 mph), which both reduces load time and keeps the dirt more "alive." Result: higher, tighter, bigger loads—and more of them.

Other Michigans save time on fill-compaction assignment

Just as the big Model 480 is producing profits in the cut, so too are two other Michigan Dozers saving money for Owner Steele on the fill. These units are both 262 hp Model 280's. They are spreading fill and compacting . . . achieving specified 95% Proctor in two to three high-speed (7½ mph) passes.

Speed scattered odd jobs

And that's not all. Go-anywhere 28 mph mobility allows the Michigans to sneak away from main assignments to tackle emergency jobs. Towing disabled vehicles, for example. Back-filling around culverts. Building up low spots in haul roads.

These are just a few of the odd jobs. *But the real advantage of Michigan Dozers,* Mr. Steel says, *is their ability to outperform crawlers on many production jobs too.* And do it day after day, with dependability equal to that of Michigan Tractor Shovels. There are four size Dozers to choose from: 162, 262, 375, and 600 hp. Your Michigan Distributor will be glad to show you one in action so you can judge its advantages for yourself.

Michigan is the registered trademark of

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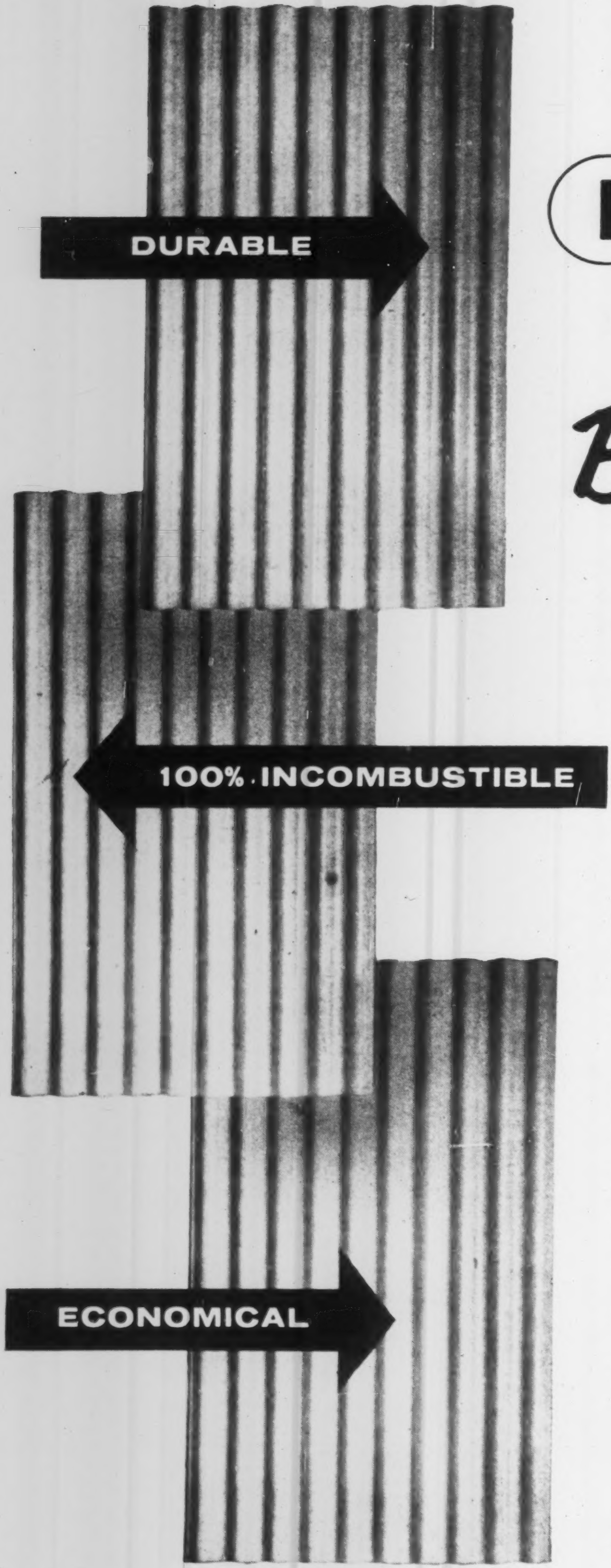

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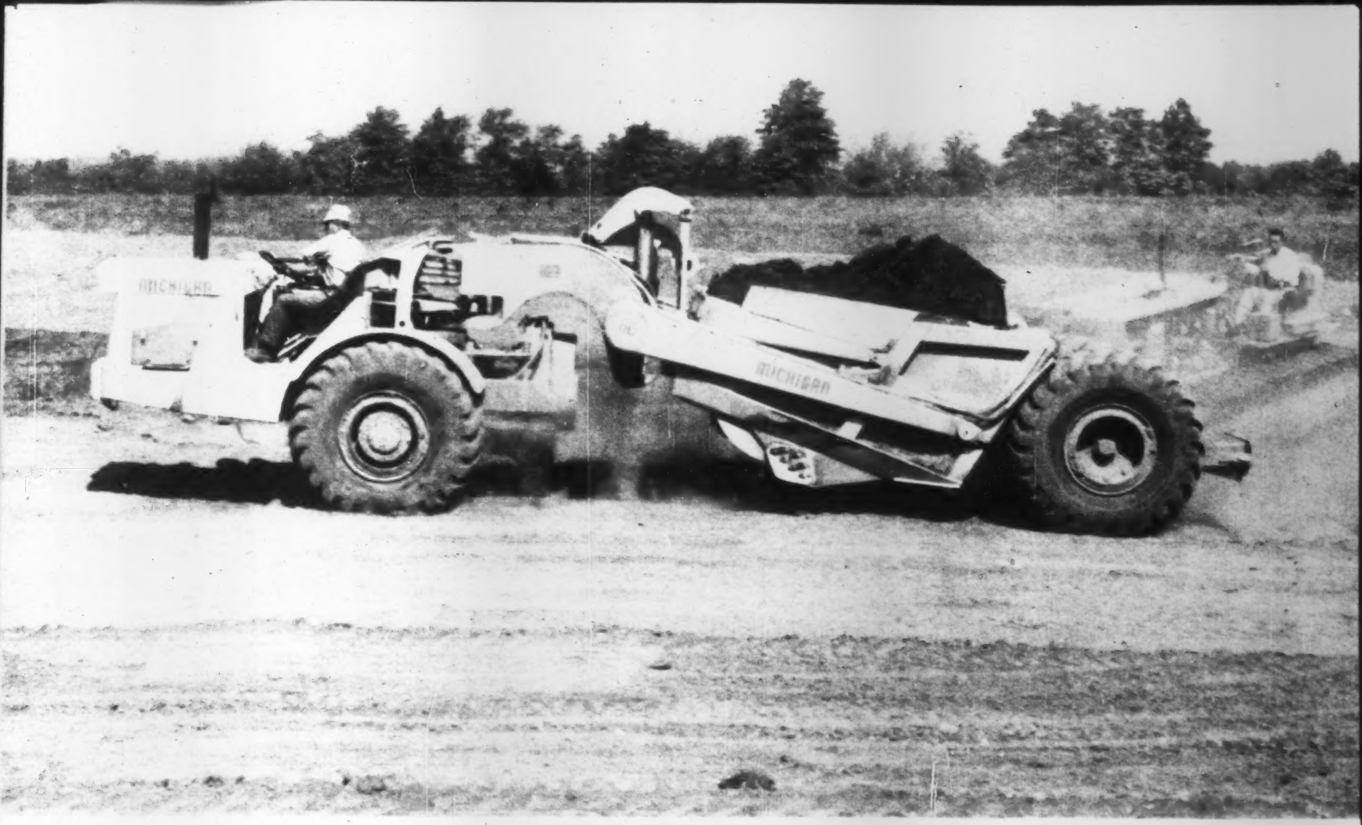

Operator training a problem?

Look how Michigan Scrapers licked it for this N.J. contractor

Take a look at the operators on Salleon Incorporated's scrapers. You're liable to see a new man every week or two. The reason is the high cost of labor. Handling mostly small contracts, this Somerville (New Jersey) firm frequently finds it most economical to lay off men between jobs—then rehire when they go onto a new site. "In half a month's time," explains Jim Seibert, company president, "we may be forced to use two or more different operators per machine."

Clutching—none

"Under these conditions, it's naturally important to us that scrapers be as easy to operate and as easy to take care of as possible," continues Mr. Seibert. "We looked at them all . . . and decided on 10½ yard Model 110 Michigans. *Their power steer, power shift, and torque converters take the effort out of moving dirt!* New operators become pretty proficient after only a few cycles. Nobody wears away clutches, because there is no foot clutch. Gear selection is no longer critical; torque converter drive automatically balances speed and load.

"Michigan's hydraulic system is simple to master, also. The power train is easy to get at. What's more, based on our experience of last season, I feel Michigan 110's will prove extremely dependable over their entire working life."

Output—160 pay yds hourly on 500 ft cycles

Production has been very good! On a typical housing development job, cutting roadways, each Michigan averaged 20 loads per 50-minute hour. One-way hauls were approximately 250 ft. Loading, with 85 hp pusher, took 40 to 45 seconds. Payloads in clay averaged 8 bank yards.

On tougher jobs—cutting railroad sidings and excavating industrial basements, for example—the 162 hp Michigans frequently are teamed with a 140 hp pusher (which cuts load time to 25 to 30 seconds).

Self-loads satisfactorily

Occasionally they work alone, self-loading close to their 8 yd struck capacity.

In tight-quarter assignments—like grading between houses and building driveways—their power steer and short turn radius speed cycles.

The machines drive everywhere under their own power. Speeds up to 31½ mph.

Check Michigan Scraper advantages on your job

Mobility, versatility, output—*and ease of operation like this*—we think, can help you too. For proof, we'd like to *show* you, first-hand, what Michigan Scrapers can do on the only job you *really* care about—*your own!* Let us bring a demonstrator to your work area. Let your own operators run it. Measure output. Compare performance. Then pick the size you need! Three models available, 10½, 19, 29 yds heaped.

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(Continued from page 246)

▲ **Tex., Richardson**—SCHOOLS—Richardson Ind. School Dist., voted bonds May 23. Elementary School No. 1, $875,000; Elementary School No. 2, $750,000; Elementary School No. 3, $600,000; group school addns., $750,000; Junior High School Unit, $1,000,000; Senior High School Unit, $1,250,000. CD 11/26/57.

▲ **Tex., San Antonio**—JAIL—Bexar County, Courthouse cancelled bond election May 30, jail $3,850,000. CD 5/22.

▲ **Utah, Cedar City**—SCHOOLS—Iron County Bd. Educ., Cedar City, voted $2,900,000 bonds May 18, high school $2,500,000. Gardner & Rasmussen, 173 South 2nd West, archts. CD 5/13.

Utah, St. George—AUDITORIUM, etc.—State Bldg. Bd., 319 State Capitol, Salt Lake City, plans by Wm. Rowe Smith, 1555 E. 39th S., Salt Lake City, auditorium and multi-purpose bldg. $700,000.

▲ **Utah, Salt Lake City**—PARKING PLAZA—State Bldg. Bd., 419 State Capitol Bldg., plans by Scott & Beecher, Dooly Bldg., 180-200 cars rein. con. parking plaza connecting present capitol and office. $1,160,000.

Wis., Menomonie—COURTHOUSE—Dunn Co., plans by Schubert, Sorensen & Assoc., Inc., 308 [illegible] Bldg., LaCrosse and Eckert & Carlson, Winona, Minn., courthouse. $835,000. Bids soon. CD 8/28.

▲ **Wis., Oshkosh**—SCHOOL—Bd. Educ., plans by Perkins & Will, 309 W. Jackson Blvd., Chicago 6, Ill., high school. $3,000,000. Bids about July. CD 2/17/58.

Ont., Windsor—GOVERNMENT—Dept. P. Wks., East Block, Parliament Bldgs., Toronto, Provincial Government Bldg., Park and Goyeau Sts. $400,000.

Que., Donnacona—SCHOOL—Provincial Dpt. Youth & Social Welfare, Parliament, Quebec City, Que., Arts and Trades School, Rue de l'Eglise. $500,000.

▲ **Que., Pointe Claire**—SCHOOL—Pointe Claire & Beaconsfield Catholic School Comm., 16 Neveu St., Beaurepaire, plans by Marc Angers, archt., 35 Ave. de l'Eglise, Pointe Claire, and Dufresne & Boulva, assoc. archts., 1225 Hodge St., St. Laurent, 2 story, bsmnt. high school. $1,000,000.

COMMERCIAL BUILDINGS

Ala., Montgomery—TELEPHONE BLDG.—Southern Bell Telephone & Telegraph Co., 126 Church St., telephone bldg., Dalraida Rd. and Atlanta Highway. $400,000.

▲ **Ala., Tarrant City (Br. Birmingham)**—RESIDENCES—[illegible], 215 [illegible] St. N., Birmingham, 200 residences, $2,000,000. Warren Knight, 207 [illegible] Bldg., Birmingham, consult. engr.

▲ **Ariz., Phoenix**—STORE—Park Central Development, 3418 N. 7 Ave., plans by Welton Becket & Assocs., 5657 Wilshire Blvd., Los Angeles, Calif., 37,000 sq. ft. Goldwaters Park Central Store expansion. $1,000,000.

▲ **Ariz., Tucson**—MOTOR HOTEL—Ramada Motor Hotel Corp., 3825 E. Van Buren St., Phoenix, motor hotel. $3,000,000.

Ariz., Williams—HOMES—Steves Bros. Constr. Co., Flagstaff, 45 homes, Kaibab Estates, northeast of here. $585,000. Construction will start in 90 days.

▲ **Calif., Visalia**—SHOPPING CENTER, etc.—L. H. Uhlman, Jr., 3450 Wilshire Blvd., plans by Albert C. Martin & Assocs., 333 Beaudry St., Los Angeles, Carl Maston, 922 N. La Cienega Blvd., Los Angeles and Hammarberg & Herman, 2941 Telegraph Ave., Berkeley, shopping center, incl. 40,000 sq. ft. department store, bank, medical bldg., restaurant, small shops, south of W. Mineral King. $3,500,000. CD 11/25/57.

▲ **Colo., Wheatridge**—SANATORIUM—Lutheran Sanatorium, 8300 W. 38 Ave., plans by Leonard F. Crockett, 506 N. Lincoln St., Odessa, Tex., 3 story, 60,000 sq. ft. sanatorium expansion, $1,500,000. Ross Garrett & Assocs., 3240 N. Lake Shore, Chicago, Ill., consult. engrs., James H. Johnson, 9190 W. Colfax, Lakewood, assoc. archt. CD 4/22.

Conn., Bridgeport—OFFICE—Sidney F. Brown et als., 1020 Fairfield Ave., 1 story, half-crescent shape [illegible] design office bldg., 4561 Main St. $400,000.

Conn., Darien—HOUSES—Irving Woods, Middlesex Rd., 47 houses, "Irving Woods," Middlesex Rd. $470,000.

▲ **Conn., Monroe**—HOUSES—Palmer Realty Corp., 144 [illegible] Brook Ave., Bridgeport, 100 houses, "[illegible] Estates," Purdy Hill Rd. $1,490,000.

Conn., New Britain—SHOPPING CENTER—Stanley [illegible], Agt., 112 Broad St., plans by [illegible], 476 W. Middle Tpk., Manchester, 2 story, 30,000 sq. ft. shopping center, Farmington Ave. $600,000.

▲ **Conn., New London**—MOTEL, etc.—[illegible] DeAngelis, 225 [illegible] Bldg., Rochester, N. Y., 100 unit motel and stores, Perry's Pond. $1,000,000.

Conn., West Haven—APARTMENT—Joseph F. Kelly, [illegible], 184 Front Ave., apartment, 602-610 Ocean Ave. $650,000.

Conn., Vernon—HOUSES—[illegible] A. McCarthy, [illegible] Vernon St., Manchester, 33 houses, "Phoenix Ridge," Phoenix St. $475,660.

▲ **Conn., West Hartford**—HOUSES—Goldberg & [illegible], [illegible] Brook [illegible], 50 houses, "Cedar Hill [illegible]." $1,112,500.

▲ **Conn., West Hartford**—HOUSES—The [illegible], 24 [illegible] St., Hartford, 68 houses, "[illegible] Manor." $1,439,400.

Conn., West Haven—HOUSES—McLean & Tiernan, 407 Howard Ave., New Haven, 41 houses, "M[illegible]haven," Meloy Rd. $541,200.

▲ **Fla., Miami Beach**—APARTMENT—Charles Marte & Ben Cohen, 420 Lincoln Rd., plans by B. R. Swartburg, 4014 Chase Ave., 14 story apartment, 4900 Collins Ave. $1,000,000.

Ga., Columbus—MOTOR HOTEL—Martinique Corp., P. O. Box 391, plans by Brook, Bank & Murphy, 1018 13 St., motor hotel. $400,000.

Hawaii, Honolulu—THEATRE—Royal Theatres Ltd., 1370 S. Beretania, plans by Wimberly & Cook, 315 Royal Hawn. Ave., theatre, Waikiki Beach. $500,000.

▲ **Idaho, Boise**—MOTOR HOTEL—C. D. Stratton, E. Bryson & G. Schlatke, 4803 San Marino Rd., 150-room motor hotel. $1,000,000.

Ill., Chicago—OFFICE—American Library Assn., 50 E. Huron St., 5-6 story office. $800,000. Bids Spring 1960.

▲ **Ill., Rockford**—HOMES, etc.—Rosenquist & Schabacker, Realtors, 975 N. Main St., 300 homes and shopping center, Ridge Haven and Knob Hill subdivision vicinity of Alpine Rd. and Harrison Ave. $2,000,000.

Ind., Crawfordsville—SUNDAY SCHOOL—First Methodist Church, 210 E. Wabash St., plans by Burns & Burns, 509 Archts. & Bldrs. Bldg., Indianapolis, 2 story, bsmnt., brick, concrete Sunday School. $400,000. Fenning & Weir, 811 Broad Ripple Ave., Indianapolis, consult. engrs.

▲ **Ind., Indianapolis**—LIBRARY—Butler University, 4600 Sunset St., plans by Minoru Yamasaki, Birmingham, Mich., library. $1,000,000. CD 1/31/55.

Ind., South Bend—MEDICAL ARTS—Herbert Feldman & Assocs., 732 Cherry Lane, plans by Anthony Pagoria, 1242 Mishawaka, Jefferson Medical Arts, and site preparation, Francis St. at Jefferson Blvd. $650,000. Tenkonohy & Collins, 1610 Mishawaka Ave., engrs. CD 7/1.

▲ **Ind., Valparaiso**—SHOPPING CENTER—[illegible] & [illegible], Elmwood Park, Ill., plans by Sidney H. Morris & Assoc., 144 N. LaSalle St., Chicago, Ill., 1 story, brick and block shopping center, Rte. 49. $1,500,000.

▲ **Kan., Wichita**—SHOPPING CENTER—West Way [illegible], [illegible] Ewing, [illegible], [illegible] Bldg., Springfield, Mo., plans by A. C. Esterly, McDaniel Bldg., Springfield, Mo., West Way Regional Shopping Center, 250,000 sq. ft., [illegible] steel frame, masonry walls, air conditioned stores, incl. 3,600 car parking. $4,500,000. May start first phase in August.

Md., Baltimore—OFFICE—Baltimore Life Insurance Co., Charles and Saratoga Sts., Zone 1, plans by Fisher

(Continued on page 252)

FRANK J. KNIGHT CO. GIVES NEW ERIE PAVING PLANT CREDIT FOR POURING 11 MILES OF CONCRETE HIGHWAY AHEAD OF TIME

Recently, the Frank J. Knight Company of Detroit poured 11 miles of highway ahead of schedule. The Knight people give a lot of credit for the job to their Erie Portable Road Paving Plant.

Said Mr. Theodore F. Knight, President, "Our new Erie Plant has 3 features that helped us to beat our schedule: 1) Fast set-up and takedown. Our men did the erection. 2) Simple operation. One operator handles automatic controls for entire plant. Push-button discharge lets drivers load their own trucks. 3) Automatic controls that assure fast, accurate batching."

The performance that pleased the Knight Company is not unusual. They can expect it every time. So can you. Find out today how much you can save on batching with Erie equipment. Write for Bulletin R-39

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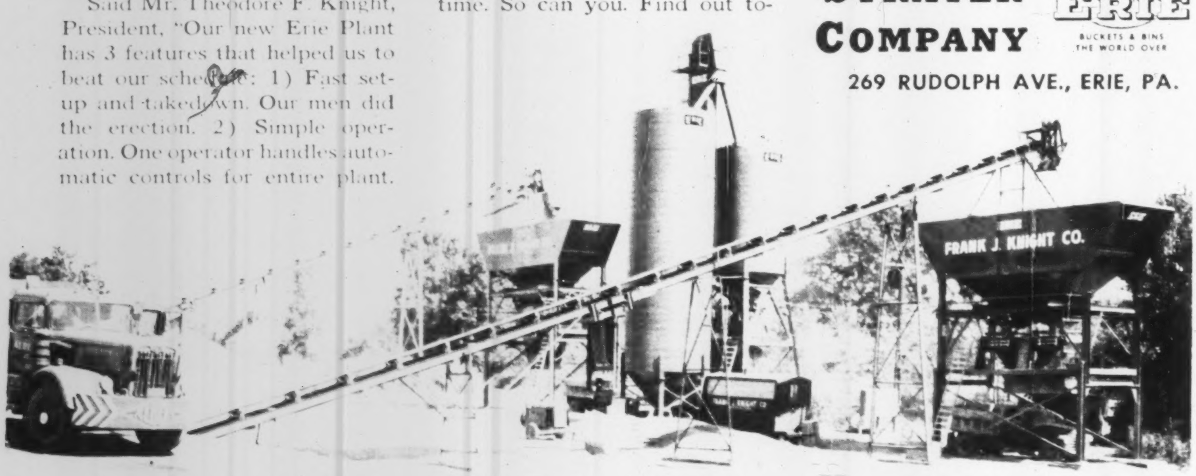
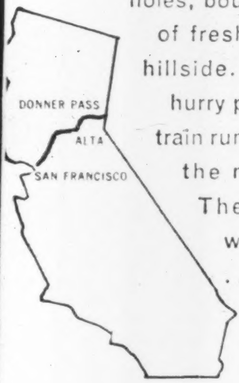


In the rugged mountain country of eastern California, U. S. Highway 40 twists and curves past the little towns of Colfax, Alta, Baxter and Emigrant Gap on its way east to Donner Pass. Tall pines, mud holes, boulders and patches of fresh snow cover the hillside. Cars and trucks hurry past; a long freight train rumbles by further up the mountain slope. Then . . . a cold wet wind stirs the trees . . the earth grunts, shifts . . . and . . . ROCK SLIDE!!!



Giant mud slide blocks U.S. 40. Traffic stopped 'til Michigan goes to work

4-yd Tractor Shovel clears huge boulders

Early last winter, 100,000 cubic yards of mud, rock and earth tore away from a mountain-top near Alta, Calif. The muddy wave toppled trees and sucked up boulders—picked up speed as it tumbled down to Highway 40—dumping its load across the road shoulders and pavement.

To put ruffled nature back in place, the State of California, Division of Highways, called for bids. J. O. Archibald Company, general contractor from Redwood City, was awarded the job.

Archibald rushed his normal earthmoving fleet of scrapers, tractors, shovels and trucks to clear the highway, and to stabilize the hillside by terracing. But as they cleared away mud and rock, volcanic ash and sandstone, work crews came across giant boulders that required special treatment. Archibald didn't want to blast any more rock than necessary. Blasting would add to the cost of the project. Hoses and compressors would slow earth-moving. And any more vibration might set off another slide!

Special rock, special tool

So Archibald scanned his equipment roster, then selected a Tractor Shovel that in four passes was loading out 18 and 20 yard haul trucks. His machine—a Michigan Model 275A—swung a big bucket, all right. Four yards. But big enough to handle the big rock? Say a boulder 10 feet in diameter?

It became Operator F. E. "Mac" McKinsey's job to find out. Mac had put in lots of time on Archibald's 2¼-yd Michigans—also had clocked almost 200 hours on the new 4-yd Model 275A. But that was more-or-less straight truck-loading work. What could the 275A do halfway up a mountainside, working in treacherous, muddy footing, on steep slopes, moving boulders as required to a gully half a mile away.

Carries 8 tons, dozes 10

Under these conditions, the Michigan went to work. First, the operator edged Michigan's bucket lip under a typical giant boulder. Then, careful work of the hydraulic controls gently raised and tipped the bucket as operator felt his way under the huge rock. If the boulder could be lifted, more than likely it could be carried. And it was, load kept low—just off the ground.

So the job continued, the Michigan by itself moving a stream of 8 to 10 ton boulders to the dump area. Even when a rock was too big to see over, Michigan carried it . . . the operator simply driving in reverse. Power steer and identical speeds forward and reverse made this easy. Other times, when boulders weighed over 10 or 11 tons, or when one was so odd-shaped it couldn't be carried in the bucket, the 262 hp Michigan simply *dozed* it the half mile to the edge of the gully.

Could the ability to handle 4 yds—lift up to 11 tons per pass—help solve *your* production problems? To help you judge for yourself, we'll be glad to show you a Model 275A in action. Call to arrange time and place.

Powerful Michigan works bucket under 10-ton boulder, lifts, and away goes the huge load.

Michigan is a registered trademark of

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Construction Machinery Division
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Benton Harbor 20, Michigan
In Canada:
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St. Thomas, Ontario

(Continued from page 250)

Nes, Campbell & Assocs., 2120 N. Charles St., Zone 18, 4 story, 60,000 sq. ft. office, Park Ave. and Preston St. $600,000. Van R. P. Kaee, 1701 St. Paul St., Zone 2, structural engr. Henry Adams, 2315 St. Paul St., Zone 2, mechanical engr. CD 2/11.

Mass., Waltham—APARTMENT—Devincent Brothers, Forest St., garden type apartments, off Main St. and near Rte. 128. $500,000. Constr. 1959.

Mass., Waltham—CHURCH—Sacred Heart R. C. Parish, 311 River St., plans by Aldo A. Minotti, 591 Main St., church, Newton and River Sts. $400,000. Constr. late 1959.

▲ Minn., Minneapolis—GATEWAY CENTER—owner, c/o H. Z. Mendow, 512 Nicollet Ave., Minneapolis, plans by Liebenberg & Kaplan, 51 South 13th St., "Gateway Center" to incl. restaurant, radio studio, theater, shops, plaza with pool, underground 35-lane bowling alley, etc. Nicollet and Marquette Aves., 3rd and 4th Sts. $4,500,000.

Minn., New York Mills—HOME FOR THE ELDERLY—Elders Home, Inc. (Apostolic Lutheran Church main sponsoring agent), plans by Stegner-Hendrickson, 2 O'Brien Center, Brainerd, home for the elderly. $450,000. Bids soon.

▲ Minn., Roseville (P. O. St. Paul)—SHOPPING CENTER—H. J. Slawik Properties, Inc., 2388 University Ave., 223,000 sq. ft. Snelling Plaza shopping center, Snelling and Skillman Aves. $3,000,000.

▲ Minn., South St. Paul—HOSPITAL—Divine Redeemer Memorial Hospital, L. J. Hurley, assocs., consultant, 1009 South Robert St., plans by S. J. Smiley & Assocs., 1750 Hennepin Ave., Minneapolis, 150-bed hospital, North 19th and Thompson Aves. $2,225,000. CD 3/5.

Neb. Blair—DORMITORY—Dana College, Blair, plans by Davis & Wilson, 226 Stuart Bldg., Lincoln, 4-story dormitory (residence hall) for women. $496,000. CD 5/6.

▲ N. J., West Orange—INSTITUTE—Kessler Institute, Pleasant Valley Rd., plans by Pomerance & Breines, 33 West 46 St., New York, N. Y., institute addn. $1,000,000.

N. Y., Bronxville—DORMITORY—Sarah Lawrence College, dormitory. $880,000.

▲ N. Y. Buffalo—BANK—Liberty Bank Bldg. Assocs., Liberty Bank Bldg., plans by Duane Lyman & Assocs., 505 Delaware Ave., 20 story office addn. $1,500,000. CD 5/18.

N. Y., Buffalo—SCHOOL addn., etc.—Salvation Army (Hdq. Western N. Y. Div.) 690 Main St., plans by Kideney, Smith & Fitzgerald, 220 Delaware Ave., school and gymnasium addn., Main St. $425,000.

▲ N. Y., Glenmont—SEMINARY—Vincentian Missions, 500 East Chelton Ave., Phila., Pa., plans by Urbahn, Brayton & Burrows, 635 Madison Ave., New York, Zone 21, seminary. $3,000,000. DiStasio & Van Buren, 136 Liberty St., New York, Zone 6, structural engrs. Syska & Hennessy, Inc., 144 E. 39th St., New York, Zone 16, mechanical engr. James F. Summers, 90 State St., Albany, consult. engr. Bids in December. CD 2/27.

N. Y., New York—APARTMENT—Aguilar Corp., 70-48 Olcott St., Forest Hills, plans by Mayer, Whittlesey & Glass, 31 Union Square, Zone 3, apartment, 37-9 W. 12th St. and 12-28 W. 13th St. $400,000.

N. Y., Port Richmond—SCHOOL, etc.—Archdiocesan Bldg. Comm., 451 Madison Ave., New York, Zone 22, plans by Anthony J. DePace, 151 W. 46th St., New York, Zone 19, school and auditorium for St. Adalbert's Parish. $400,000.

▲ N. Y., Tonawanda—HOMES—Fisher Homes, Inc., c/o Hunt Realtors, 17 W. Huron, Buffalo, 50 single homes, Abbington Ave. $1,000,000.

N. Y., West Seneca—STORE—South Gate Plaza, 839 Union Rd., plans by Joseph Geigand, 234 Orange St., Buffalo, store. $500,000. Lerner Shops, New York City, lessee.

▲ O., Akron—SHOPPING CENTER—Springfield Plaza, Inc., Raymond Martz, pres., Hartville, 270,000 sq. ft. shopping center, near intersection Rte. 8 and 224. $3,800,000. Constr. in fall.

▲ O., Bedford Heights—HOMES—The Bedford Co., 3763 Lee Rd., Cleveland, Zone 28, 250 homes, Parkview Heights development, just west of Bedford Ridge Estates. $3,500,000.

▲ O., Cleveland—FIELD HOUSE—Catholic Diocese of Cleveland, 1027 Superior Ave., Zone 14, field house at Benedictine High School. $1,000,000.

O., Cleveland—OFFICE—Nationwide Properties Inc., 191 Broadway, Paterson, N. J., plans by Irving D. Robinson, 1900 Euclid Ave., Zone 3, 4 story, bsmnt., 40,000 sq. ft. office. Over $400,000. National Cash Register Co., lessee. Bids in September.

▲ Ore., Portland—OFFICE—Standard Insurance Co., 812 S. W. Washington St., plans by Skidmore, Owings & Merrill, 30 W. Monroe St., Chicago, Ill., 20 story office, Main and Madison Sts. $8,000,000. Dames & Moore, Terminal Sales Bldg., consult. engrs. Cooper & Rose, Builders Exch. Bldg., structural engrs. CD 4/8.

▲ Pa., Scranton—STUDENT UNION—University of Scranton, 4 Ridge Row, student union and dining hall. $1,000,000.

▲ Tenn., Maryville—SHOPPING CENTER—Gene Manday Realty Co., 311 W. Vine Ave., Knoxville, shopping center midway between Alcoa and Maryville, State 73. $1,000,000-$1,500,000.

▲ Tenn., Maryville—SHOPPING CENTER—White Stores Inc., 133 Broadway N.W., Knoxville, shopping center. $1,000,000.

Tex., Dallas—CHURCH—Highland Park Methodist Church, 3300 Mockingbird Lane, plans by Mark Lemmon, Thomas Bldg., church. $700,000. CD 11/27/56.

▲ Tex., Ennis—DWELLINGS—Stayton & Odom Development Co., 37 dwellings $412,500; 40 dwellings $418,150; 42 dwellings $431,000; 28 brick veneer dwellings $442,000; 17 brick veneer dwellings $425,000; 25 brick veneer dwellings $428,200, Casa Linda and Preston Hollow Subdivisions.

▲ Tex., Fort Worth—DWELLINGS—Dr. J. Chambers, 501 Hazelwood St., 193 dwellings, Eagle Heights Country Estates. $2,000,000. Carter & Burgess, 1100 Macon St., consult. engrs.

Tex., Fort Worth—DWELLINGS—W. T. Johnson, W. Exchange Ave., 73 dwellings, Triangle Estates, Eagle Mt. area. $730,000.

▲ Tex., Fort Worth—DWELLINGS—E. L. Trimble, 4116 Selkirk Dr. West, 58 dwellings, Hallmark Addn. Over $2,000,000. C. A. West, 1091½ Main St., consult. engr.

Tex., Houston—APARTMENT—Kellis Daniel, South Coast Bldg., brick apartment with swimming pool, Dunstan and Tangle Sts. $400,000.

Tex., Houston—DWELLINGS—Metropolitan Homes (Bill Mandel, pres.), Bankers Mtg. Bldg., 58 dwellings. $420,000.

▲ Tex., Houston—DWELLINGS—(Fiesta Homes) Tom Overstreet & Assocs., 3316 11th St., 26 dwellings $410,000; 28 dwellings $429,500; 35 dwellings $465,000; 32 dwellings $441,150; south of Sims Bayou off Chocolate Bayou Rd.

Tex., Irving—SHOPPING CENTER—Andrew-Dillingham Properties, Exchange Bank Bldg., Dallas, shopping center named "Irving North Shopping Center". $400,000. Constr. soon.

Tex., Irving—DWELLINGS—Foresight Homes Inc., Contractors, 4922 Greenville Ave., Dallas, 30 dwellings, off Hy. 183 (GI-FHA). $405,000.

Tex., Mesquite—SHOPPING CENTER—Atlantis Corp., 2nd unit, Santa Fe Bldg., Dallas, 33,700 sq. ft. shopping center and auto paved parking center, etc. $400,000.

▲ Tex., Mesquite—DWELLINGS—H. E. Enlow Constr. Co., 101 Northridge St. (North Ridge Office) Dallas, 31 dwellings $416,100; 26 dwellings $405,750; 29 dwellings $412,000; 33 dwellings $436,450, North Mesquite.

▲ Tex., Mesquite—DWELLINGS—H. E. Enlow, Constr. Co., 3340 Sidney St. (Casa View Office) Dallas, 28 dwellings $412,000; 32 dwellings $418,350; 25 dwellings $408,125; 35 dwellings $428,000, north of U. S. Hy. 80.

Tex., Mesquite—DWELLINGS—Globe Constr. Co., 1631 Alta Vista St., 38 dwellings off Gus Thomasson Rd. $415,750.

Tex., Pasadena—OFFICE—Pasadena Towers Co., c/o James D. Coleman, 1st National Bank Bldg., plans by Jay Carroll & Assocs., 3202 Mercer St., Houston.

(Continued on page 257)

And In The South . . .

FROM MARYLAND TO FLORIDA TO TEXAS

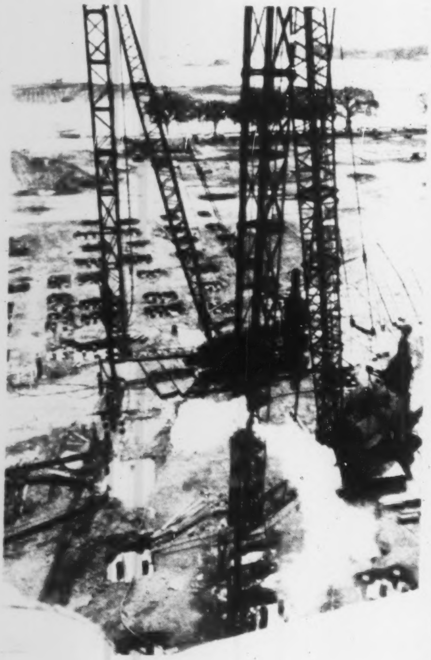
C. L. GUILD PILE DRIVING RIGS

HELP DRIVE FOUNDATIONS OF GROWTH

COBI PILES—driven by GUILD with a patented Cobi expanding mandrel, the most sensational cast-in-place development in the past fifty years—have many proven advantages:

- ECONOMY
- EASE OF INSTALLATION
- EASE OF INSPECTION
- STRAIGHTNESS
- WATERTIGHT
- MAINTENANCE OF SHAPE

SPECIALISTS IN THE USE OF COBI PILES



At Annapolis in 1958 C. L. Guild Construction Co. drove 1698 Cobi Piles up to 110 ft. in length.

Write or phone for eight-page brochure which describes the COBI PILE.

C. L. GUILD CONSTRUCTION CO., INC.

90 Water Street, East Providence 14, R. I.

BOSTON, MASS. WASHINGTON, D. C. HOUSTON, TEXAS
SYRACUSE, N. Y. ATLANTA, GA. KANSAS CITY, MO.

Michigan goes for modern Asphalt construction

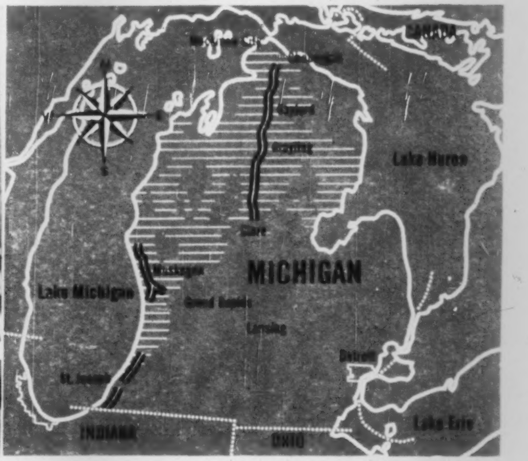
Designates 192 expressway miles for rugged, durable Asphalt pavement designed to carry 40-KIP-tandem axle loads

Ferrysburg-Muskegon Heights project proves one of smoothest-riding roads ever...and is constructed for maximum life

Pictures of six-mile pilot section show design and construction factors favoring Asphalt decision...*see inside pages*

Commissioner Mackie dedicates Asphalt pilot project . . . .

Left to right: Claude Ver Duin; Clyde M. Geerlings, State Senator; Mrs. Paul C. Miller; John C. Mackie, Commissioner, Michigan State H'wy Dept. and Mrs. Mackie; Paul C. Miller, Contractor; and the Reverend Carl Strange cut ribbon at south end of Ferrysburg-Muskegon Heights project, U. S. #31, Michigan.


CANADA
Gaylord
Grayling
Lake Huron
Clare
MICHIGAN
Muskegon
Lake Michigan
Grand Rapids
Lansing
Detroit
St. Joseph
INDIANA
OHIO
Lake Erie

Initiates 5-year, $1½ billion Michigan program

Heavy lines locate Asphalt-concrete mileage which is a part of a huge Michigan arterial expressway program. In shaded area . . . the glaciated, sandy region of Michigan . . . rugged, durable Asphalt-concrete construction is expected to save Michigan taxpayers $1.00 or more per square yard of pavement surface.

See why on inside pages

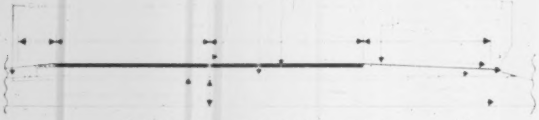
Ribbons of Velvet Smoothness
ASPHALT *paved Interstate Highways*

THE ASPHALT INSTITUTE, ASPHALT INSTITUTE BUILDING, COLLEGE PARK, MARYLAND

Michigan goes for modern Asphalt Construction (cont.)

ASPHALT DESIGN

The Asphalt-concrete structure used in paving the Ferrysburg-Muskegon Heights section of U. S. #31 in Michigan is designed to carry a minimum of 3000 vehicles per roadway per day and bear loads in excess of 40,000 pounds (tandem axle). Cross-section below is a model for the 192 miles of rugged, durable Asphalt-paved Interstate and arterial expressways to be built in Michigan in the next 4 years. (See map preceding page)



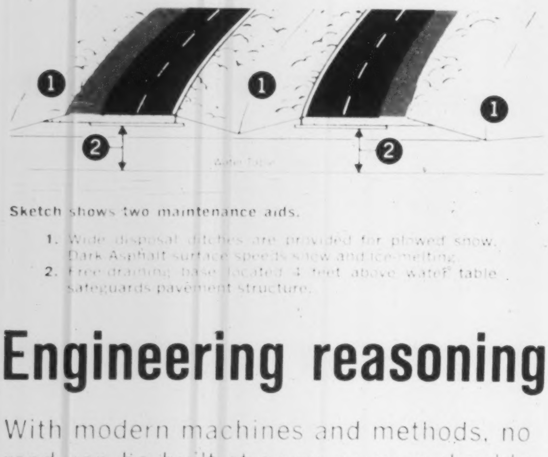
Typical Cross section (One roadway)

Strengths of base and subbase are carefully controlled. In Michigan, frost action can be serious so designers study regional soil performance records. During construction, soil bearing values are controlled by frequent density tests like this. On the Ferrysburg project, these values were kept above 100% of standard laboratory density. Thicknesses of courses are determined by modified California bearing ratio method.

CONSTRUCTION

Construction methods used in Asphalt paving the Ferrysburg-Muskegon Heights section of U. S. #31 are unusually interesting. Interesting enough, in fact, to be the subject of a ½-hour motion picture in full color.** Here we show several ways how to obtain a maximum performance highway at minimum cost. It is estimated that Asphalt construction of this six-mile highway saved between $170,000 and $180,000.

**full information on request



Sketch shows two maintenance aids.

1. Wide disposal ditches are provided for plowed snow. Dark Asphalt surface speeds snow and ice-melting.
2. Free draining base located 4 feet above water table safeguards pavement structure.

Reverse handling of spreaders prevents ruts in subbase. To prevent ruts in subbase when laying base, contractor operated spreaders in reverse. Procedure puts large-area "cat" tracks on lower-bearing-strength subbase, keeps small-area wheels of loaded trucks on already deposited higher-bearing-strength base. Tandem team of spreaders is closely followed by a 20-ton pneumatic-tired roller. Truck traffic aids, speeds base compaction.

Engineering reasoning behind Michigan's dec

With modern machines and methods, no road can be built stronger or more durable than an Asphalt-paved road. And no road construction equipment or technology is further advanced than Asphalt construction machinery and skills. The pictures prove this.

And . . . in most topographies . . . no other type road can be built for less money or lower life-of-the-pavement maintenance.

Take the situation along the eastern shore of Lake Michigan and in the northern part of the Michigan Peninsula, for example. Here, plenty of good-bearing sandy soils and a fair amount of bank-run gravel, suitable for excellent base and subbase, are at hand. Although aggregate suitable for high-type plant mixes must be imported, the cost is negligible compared to the savings realized.

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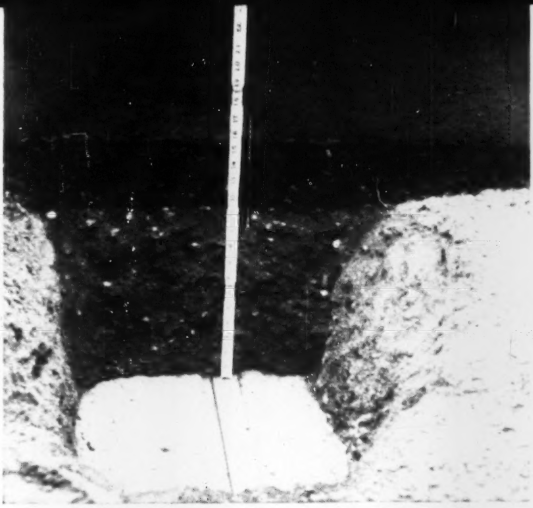
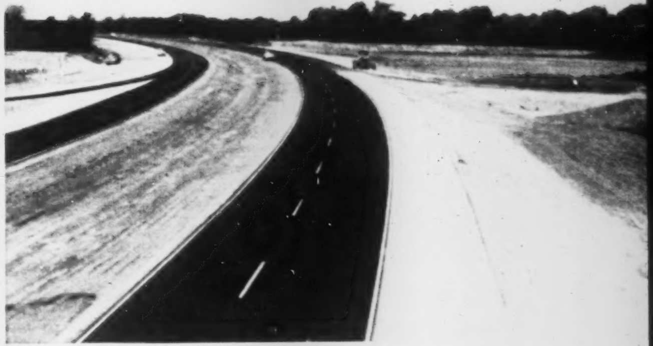


Inspection test hole reveals solidity of base and Asphalt courses. Here you see (bottom of hole) granular (sand) subbase . . . 25 inches. Above lie 3 inches of selected subbase and 8 inches of processed gravel. On this are 2 inches of Asphalt binder course (1¼-inch aggregate, 100% crushed); and 1¼-inch-each Asphalt leveling and wearing courses (⅝-inch aggregate, 100% crushed); totaling 4½ inches of Asphalt pavement.



Asphalt helps designers provide two visual safety aids. First, for the 10-foot wide Asphalt surface-treated shoulder, they specified a ⅝-inch white-limestone-chip cover aggregate. Above you see how clearly traffic-lane edge is defined. Asphalt shoulder also aids road's durability. Second, for greater safety, they took advantage of better visibility of lane markings on Asphalt surfaces. At night, the vivid contrast of lane markings against Asphalt paving aids safety.

To pre-
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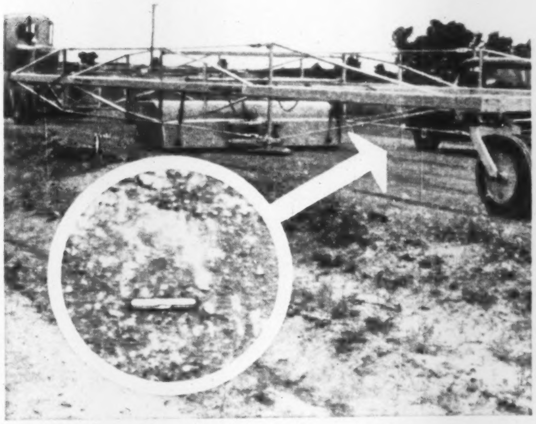
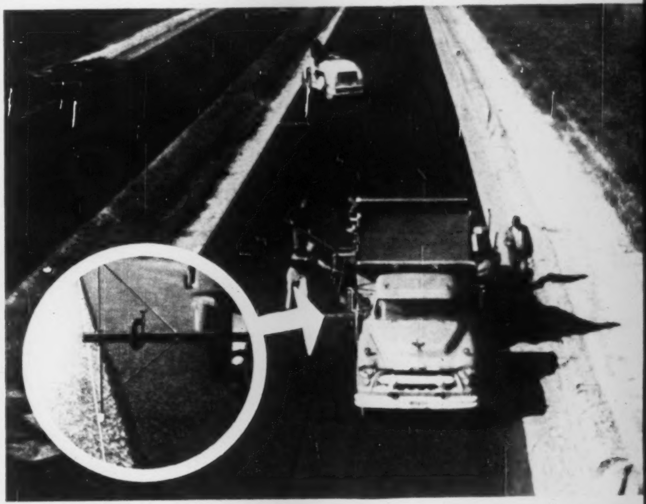
Land Plane brings surface to incredibly true grade. Blade (see insert) actually shears above-grade aggregate. By fine grading with this 60-foot wheelbase device, the completed project may be, in fact, the smoothest riding pavement ever constructed in Michigan. Note, in picture below, hydraulically operated pivot plate near Land Plane blade. This pivot plate is for on-road-bed reversing. Once raised on pivot, unit can be swung around by hand with ease.

Paver deviates less than ½-inch from established line. Take note, in the picture below, how straight the edge of this pavement is. Insert shows how this true line is maintained. On one side of the paver the contractor has placed a rigidly-mounted indicator. With this device the paver operator can easily "track" edge-of-lane marker string. The result is a highway whose looks speak for the built-in quality of Asphalt paving.





decision to Asphalt-pave 192 expressway miles

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No wonder Michigan chose modern, rugged, durable Asphalt construction for 192 miles of its proposed arterial expressways. The decision for Asphalt pavement saved Michigan taxpayers about $1.00 per square yard of pavement. Enough to build many **more** miles of needed road.

For lasting highway strength and economy, do as Michigan is doing. Pave your modern heavy-duty highways with rugged, durable Asphalt-concrete. For the latest Asphalt engineering and construction information, feel free to call on the Asphalt Institute. As shown on next page, there is an Institute District Office near you.

THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Md.

MIX DESIGN METHODS FOR HOT-MIX ASPHALT PAVING
ASPHALT HANDBOOK THE ASPHALT INSTITUTE
SPECIFICATIONS AND CONSTRUCTION METHODS FOR ASPHALT CURBS AND GUTTERS
INTRODUCTION TO ASPHALT
CONSTRUCTION SPECIFICATIONS THE ASPHALT INSTITUTE
ASPHALT PLANT INSPECTOR'S MANUAL
SPECIFICATIONS AND CONSTRUCTION METHODS for HOT-MIX ASPHALT PAVING
For Streets and Highways

Michigan goes for modern Asphalt construction (cont.)

ASPHALT LITERATURE

ASPHALT HANDBOOK—M.S. 4
CONSTRUCTION SPECIFICATIONS—S.S. 4
ASPHALT PLANT INSPECTOR'S MANUAL—M.S. 3
MIX DESIGN METHODS FOR HOT-MIX ASPHALT PAVING—M.S. 2
SPECIFICATIONS AND CONSTRUCTION METHODS FOR HOT-MIX ASPHALT PAVING—S.S. 1
SPECIFICATIONS AND CONSTRUCTION METHODS FOR ASPHALT CURBS AND GUTTERS—S.S. 3
ASPHALT POCKETBOOK OF USEFUL INFORMATION—M.S. 6
THICKNESS DESIGN OF ASPHALT PAVEMENT STRUCTURES FOR STREETS AND HIGHWAYS—M.S. 1
INTRODUCTION TO ASPHALT—M.S. 5

Items listed above and many other useful publications are available at our District Engineering Offices, (see list below) or from The Asphalt Institute Executive Offices and Laboratories in College Park, Maryland.

ENGINEERING AID

The Asphalt Institute has established District Engineering offices in the following locations. Call on your District Engineer to discuss your Asphalt problems and literature needs at any time.

DIVISION I—ATLANTIC-GULF

NEW YORK 20, N. Y., 1270 Avenue of the Americas
BOSTON 16, MASS., 419 Boylston Street
ALBANY 7, N. Y., 11 North Pearl Street
HARRISBURG, PA., 800 North Second Street
RICHMOND 19, VA., Travelers Building
ATLANTA 9, GEORGIA, 881 Peachtree Street N.E.
MONTGOMERY 4, ALA., 79 Commerce Street
NEW ORLEANS 18, LA., Maison Blanche Building

DIVISION II—OHIO VALLEY-GREAT LAKES

COLUMBUS 15, OHIO, Neil House
LANSING 16, MICH., 109 West Michigan Avenue
LOUISVILLE 7, KENTUCKY, 4050 Westport Road

DIVISION III—MIDWEST

ST. PAUL 4, MINN., 1951 University Avenue
CHICAGO 39, ILL., 6261 West Grand Avenue
SPRINGFIELD, ILL., 2606½ South Sixth Street
KANSAS CITY 3, KANSAS, 2500 Johnson Drive
DENVER 2, COLORADO, 1031 15th Street
PIERRE, SO. DAKOTA, 104 S. Euclid Avenue

DIVISION IV—SOUTHWEST

DALLAS 6, TEXAS, Meadows Building
AUSTIN 1, TEXAS, Perry A. Brooks Building
OKLAHOMA CITY 2, OKLA., Republic Building
SANTA FE, NEW MEXICO, 10 Radio Plaza

DIVISION V—PACIFIC COAST

BERKELEY 10, CALIF., 810 University Avenue
LOS ANGELES 17, CALIF., 1709 West 8th Street
SEATTLE 1, WASH., White-Henry-Stuart Building
SACRAMENTO 14, CALIF., Forum Building
PORTLAND 1, OREGON, 2035 S.W. 58th Avenue

Ribbons of velvet smoothness
ASPHALT *paved Interstate Highways*

THE ASPHALT INSTITUTE
Executive Offices and Laboratories
Asphalt Institute Building, College Park, Maryland

(Continued from page 252)

10 story office, 800 block of E. Southmore St. $750,000.

Tex., Richardson—DWELLINGS—Pettigrew, Worley & Co., 32 dwellings $416,500.

▲ Tex., San Antonio—RETREAT CENTER, etc.—Episcopal Diocese of West Texas, 108 W. French [illegible] plans by Fehr & Granger, [illegible] 15th St., Austin, retreat center and school. $1,000,000. CD 2 [illegible]

Tex., San Antonio—STORES—[illegible] Mart, Inc., 8500 Broadway Ave., plans by Herbert E. Kelmer & J. Fred Buenz, 4900 Broadway Ave., two 82,142 sq. ft. [illegible] stores [illegible] on Broadway. $850,000. [illegible] Tower, Kalbach & Engel, 909 Maverick Bldg., consult. engrs.

Tex., San Antonio—DWELLINGS—[illegible] 10 [illegible] dwellings [illegible] $415,000.

▲ Wash., Seattle [illegible] $4,000,000.

▲ Wash., Walla Walla—SHOPPING CENTER—[illegible] shopping center [illegible] 9th Hy. $1,000,000.

▲ Wash., Wenatchee [illegible] $1,750,000. [illegible] year.

▲ Wis., Madison [illegible] & [illegible] $2,000,000.

▲ B. C., West Vancouver—SHOPPING CENTER, etc.—Park Royal Shopping Centre Ltd., 1040 W. Georgia St., Vancouver [illegible] $16,000,000. [illegible] Ave., consult. engr.

Ont., Beamsville—MINISTERS' RESIDENCE—[illegible] Albright Gardens, retired ministers' residence. $500,000.

Ont., Hamilton—HOUSING—Central Mortgage & Housing [illegible] Planning & Development [illegible] Ave. W., Toronto, 91 units [illegible] housing [illegible] $500,000.

Ont., Owen Sound—HOSPITAL ADD'N—Trustees, Owen Sound General & Marine Hospital, hospital add'n, residence and training school. $793,630.

▲ Ont., Toronto—APARTMENT—[illegible] $1,550,000.

▲ Que., Jonquiere—HOUSING—[illegible] Ste. Gertrude St., 70 unit housing. $1,000,000.

Que., Sherbrooke—APARTMENTS—Alphonse [illegible] plans by [illegible] & Martel, 1080 King St. W., Toronto, Ont., four 4 story [illegible] concrete fdn. Boulevard St. Francois, $600,000.

INDUSTRIAL BUILDINGS

▲ Calif., Fresno—PLANT—Dow Chemical Co., [illegible] Midland, Mich., [illegible] plant [illegible] $2,000,000.

Conn., East Granby—PLANT—The Dexter Corp., [illegible] Hartford, [illegible] sq. ft. [illegible] $550,000.

▲ Conn., Norwalk—POWER PLANT—Connecticut Light & Power Co. [illegible] Norwalk Harbor. $15,000,000. [illegible] 2 Park Ave., New York, N. Y., [illegible] engrs. CD 7-25-57.

▲ Mass., Braintree—INDUSTRIAL DEVELOPMENT—[illegible] $1,500,000. Constr. [illegible]

▲ Mo., Kansas City—PLANT, etc.—[illegible] $1,000,000.

▲ N. M., Maljamar—NATURAL GASOLINE PLANT—[illegible] & [illegible] gasoline plant near here. $3,000,000.

▲ N. Y., Lackawanna—STAMPING PLANT—Ford Motor Co., [illegible] Bldg., Detroit, Mich., Lake Shore Road Stamping Plant expansion. $1,400,000.

▲ N. C., Chapel Hill—RESEARCH LABORATORY—[illegible] Decatur, Ala., research laboratory, $1,000,000.

▲ O., Broadview Heights—CENTRAL RESEARCH, etc.—The [illegible] Commerce Bldg., Cleveland, Zone 14; plans by [illegible] Rowley & Assoc., and [illegible] Keith Bldg., Cleveland, Zone 15, central research and development laboratory. $2,000,000.

▲ Ore., Toledo—PULP AND PAPER MILL—[illegible] Pacific Corp., Equitable Bldg., Portland [illegible] Stone & Webster Engineering Corp., [illegible] South Grand Ave., Los Angeles, Calif., consult. engrs. CD [illegible]

▲ Alta., Calgary—PLANT—[illegible] Tire & Rubber Co. of Canada Ltd., [illegible] Hamilton, Ont., [illegible] plant. Over $1,000,000.

Ont., Hamilton—PLANT ADD'N—[illegible] Tire & Rubber Co. of Canada Ltd., [illegible] warehouse. Over $500,000.

▲ Que., Granby—PLANT, etc.—Simonds Canada Saw Co. Ltd., [illegible] St., Montreal, [illegible] 112,000 sq. ft. concrete, steel, brick plant, warehouse and offices, Simonds Sts. $1,500,000.

▲ Que., Montreal—PLANT—Chrysler Corp. of Canada Ltd., 2450 Chrysler Center, Windsor, Ont., plans by Paul H. Lapointe, [illegible] Cote des Neiges Rd., [illegible] sq. ft. parts plant and zone office, Metropolitan Blvd., Pointe Claire, west of here. $1,000,000. [illegible] & [illegible] of Canada Ltd., [illegible] Windsor, Ont., consult. engrs.

▲ Que., Rigaud—PLANT—Minnesota Mining & Mfg. of Canada Ltd., P. O. Box 757, London, Ont., plant. $2,000,000.

UNCLASSIFIED

Mo., University City (St. Louis 5 P. O.)—PARKS—City [illegible] $449,000 [illegible] park improvements. [illegible]

▲ O., Toledo—MARINA—[illegible] $700,000. [illegible] $2,250,000. C. A. Chaney & Assoc., [illegible] Ave., Bethesda, Md., consult. engrs. CD 10-24-57.

▲ Utah, Salt Lake City—HEATING SYSTEM—State Bldg. Bd., 419 State Capitol, heating sys. [illegible] $1,755,000. [illegible] CD 9-27 [illegible]

† Va., Bowling Green—TRAINFIRE RANGES—U. S. Eng., 1st and Douglas Sts. N. W., Wash. D. C., trainfire ranges, A. P. Hill Military Reservation. $100,000-$500,000.

▲† Va., Fort Belvoir—AIR CONDITIONING, etc.—U. S. Eng., 1st and Douglas Sts. N. W., Wash., D. C., [illegible] hospital. $500,000-$1,000,000. [illegible] & Lawrence, 1902 L St. N. W., Wash., D. C., consult. engrs.; plans by Thos. B. Bourne Assoc., Dupont Circle Bldg., Wash., D. C., [illegible] $100,000-$500,000; security fence and road $100,000-$500,000; plans by [illegible] & Assoc., [illegible] Ave. N. W., Wash., D. C., Bldg. 318 modification $100,000-$500,000. Bldg. 327 modification under $50,000. CD 4-18-57, under Public Buildings.

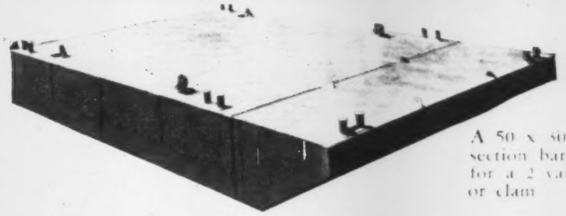
▲ Wash., Soap Lake—ALUMINUM DOME—City, City Hall, $[illegible] bond election June 30, 145 ft. diam. [illegible] $1,100,000. CD [illegible]

Wyo., Sheridan—INDIAN SHRINE—[illegible] A. A. [illegible] & Assoc., [illegible] Indian shrine [illegible] acres with [illegible] $2,000,000.

P.E.I., Charlottetown—MARINE [illegible] Canada Ltd., 1425 Mountain St., Montreal, Que. [illegible] $500,000.

MANITOWOC

SECTIONAL BARGES



A 50 x 30 foot four-section barge suitable for a 2 yard dragline or clam

- For floating all sizes of lift cranes, clams, draglines and other contractors' equipment
- Easily assembled or knocked down for moving by rail or highway
- Sections can be assembled into numerous barge sizes
- Spuds, deck fittings, loading ramps and other accessories available

Above, a sectional barge completely assembled with crane, spuds and deck equipment ready to go to work.

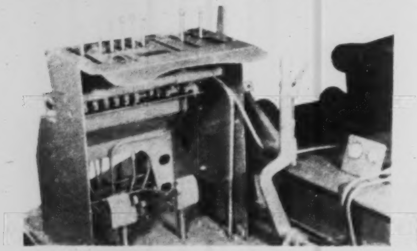
Designed for the contractor who needs low cost, flexible and portable floating equipment, a typical clam operation performed from a sectional barge

MANITOWOC SHIPBUILDING INC.
MANITOWOC • WISCONSIN

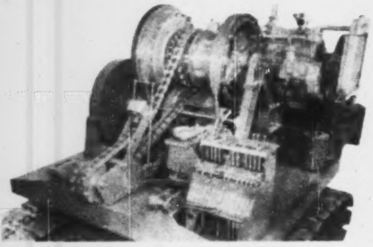
Write for additional information and prices.

Sold direct or through Manitowoc Engineering Corporation distributors.

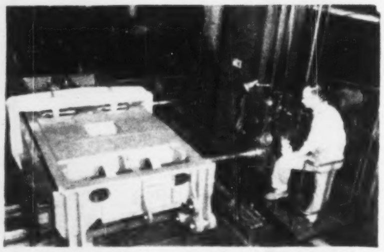
Six reasons why Link-Belt Speeder . . .



1. SPLIT-SECOND FINGERTIP CONTROL — Exclusive Speed-o-Matic power hydraulic controls put a K model through its paces at a flick of an operator's wrist . . . minimize fatigue . . . encourage high production throughout the shift.



2. BONUS USABLE HORSEPOWER — The extra strength built into load-carrying components permits K models to take full advantage of the engine's available horsepower and still remain well within engine manufacturers' recommended speeds.



3. PRECISION ALIGNMENT TO CUT MAINTENANCE — Close-tolerance machining, including jig line boring (above), means closer fits . . . less chance for eventual misalignment . . . no need for shims . . . better parts interchangeability.

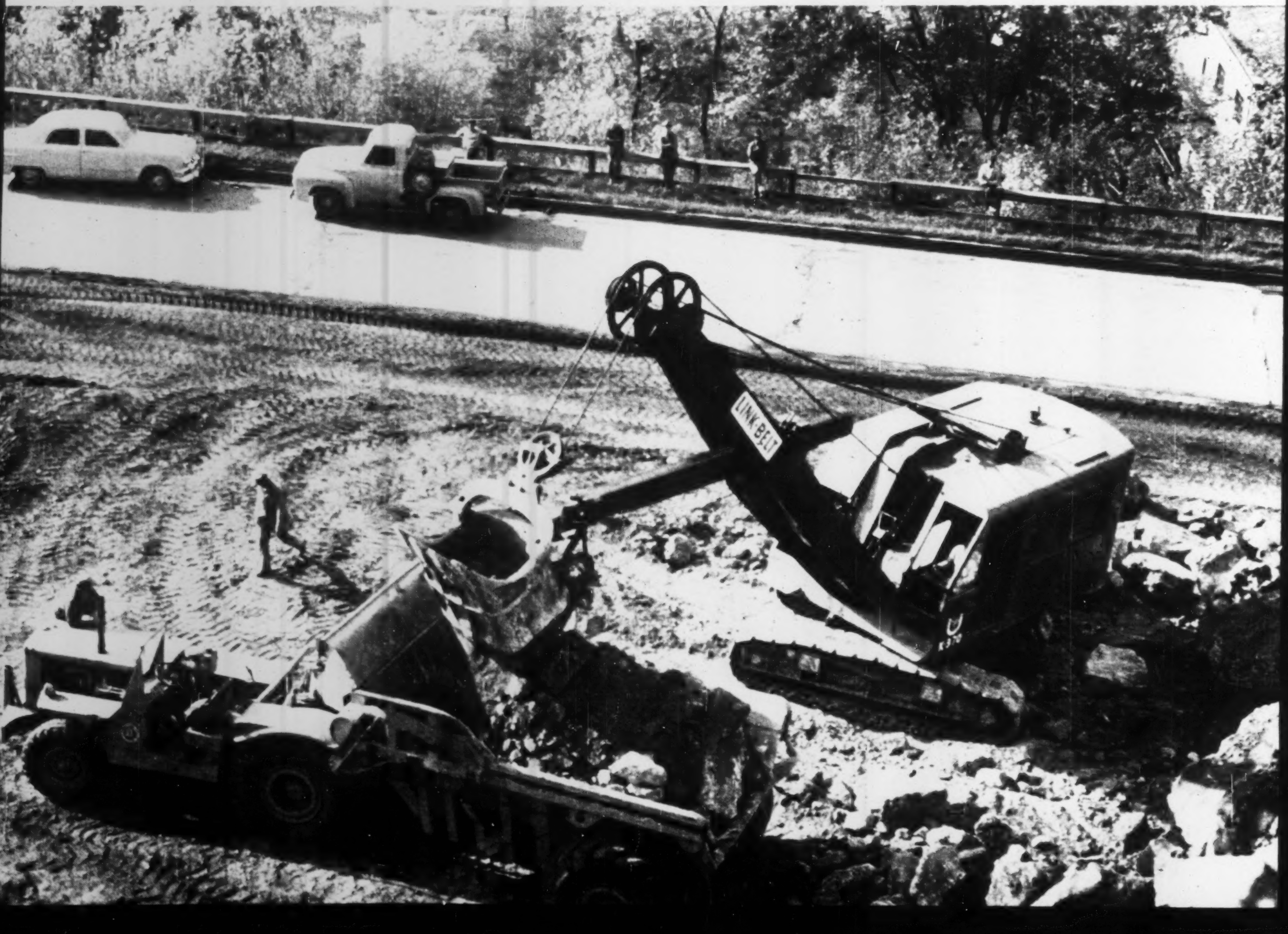
King-size K models

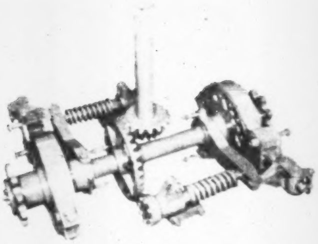
Here's how the 1¾-yard K-370 Series is tailored to today's economy . . . why it's a better buy than any 1½-yard shovel-crane . . . more practical to use than many 2-yard rigs

In comparison with 1½-yard machines, the 1¾-yard K-370 offers much more than just a 16% advantage in bucket capacity. It's fast, easier handling . . . exceptionally maneuverable and easy to transport. It boasts the top usable horsepower in its class . . . even outrates some 2-yard rigs.

For the complete story, see your distributor or write for the new 20-page catalog, No. 2727.

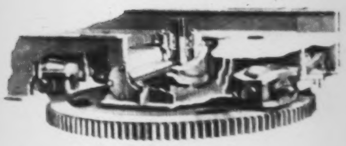
LINK-BELT SPEEDER CORP., CEDAR RAPIDS, IA.





4. EXCEPTIONAL ON-THE-JOB MANEUVERABILITY—Traction mechanism features hydraulic power steer. This, plus high speed power shifting, makes K models great for work in tight quarters. No time wasted to manually engage jaw clutches.

5. EASY JOB-TO-JOB TRANSPORTABILITY—Any K model can be readied for lowboy or rail car transport in short order. Crawler side frames, counterweight and attachments can be removed to meet weight or width restrictions.



6. NO BINDING STRESSES ON CENTERPIN OR ROLLERS—Exclusive centerpin trunnion and oscillating conical roller design eliminates concentrated centerpin loadings. . . prevents shearing or bending . . . minimizes wear.

deliver bonus output

And here's why the 3-yard K-608 series outmaneuvers smaller rigs . . . often outproduces bigger machines

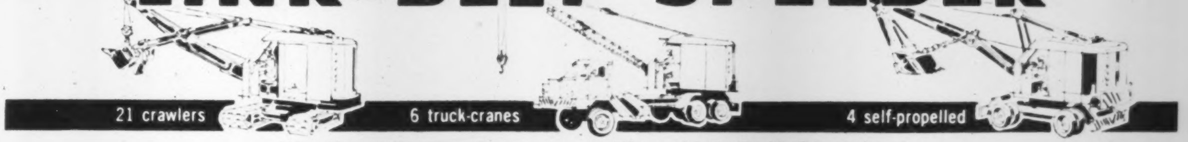
The K-608 has created real excitement wherever it has been used. It's so fast, so easy to handle, so powerful!

And no wonder—with Speed-o-Matic controls, power shift, power steer and many other features, the K-608 wheels through cycles at a speed you'd expect only from smaller rigs. The K-608 features an engine-torque converter and tailshaft output governor combination as standard equipment. The result—ability of engine power to adapt to load requirements . . . no chance for engine stalls.

For all the facts, see your distributor or write for the new 20-page catalog, No. 2710.

14.[illegible]

LINK-BELT SPEEDER



It's time to compare . . . with a Link-Belt Speeder

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BUILDINGS—SLC

Mass., **Norton** — DORMITORY — Wheaton College, Bd. Trustees, soon lets contract Dormitory No. 3, $450,000. Rich & Tucker Assoc., 45 Newbury St., Boston, archts. CD 1/14.

BUILDINGS—LB & CA

Wright & Morrissey, Inc., 263 South Champlain St., Burlington, Vt., LB **$627,900**, est. $600,000, Base Bid, PHS Proj. Vt-13, CONVALESCENT NURSING HOME, BURLINGTON, VT. DeGoesbrand Memorial Hospital, 5 Prospect St., Burlington, Vt. Bids June 6. CD 5/19.

American Constr. Co., 100 Airport Rd., Hartford, Conn., LB **$479,000** (4 bidders), altering Washington Junior High SCHOOL, Pleasant St., MERIDEN, CONN. Town, Bd. Educ., 22 Liberty St., Meriden, Conn. Bids June 2. CD 5/6.

▲ **Larsen & Symington Constr. Co.,** 405 Temple St., New Haven, Conn., CA **$1,950,000**, 195 HOUSES, Murdock Ave., 120 acre tract, MERIDEN, CONN. Vegan F. Larsen Co., 405 Temple St., New Haven, Conn. Awarded June 5.

A. V. Tuchy, Inc., Brookfield St., Norwalk, Conn., CA **$445,000**, MOTEL, incl. swimming pool, Post Rd., WESTPORT, CONN. Nat Greenberg Realty Agency, 117 E. State St., Westport, Conn. Bids Apr. 30, awarded June 4. CD 5/27.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ N. Y., **New York** — HOUSING — BA 6/24 — New York City Housing Auth., 299 Broadway, New York, Zone 7, (1) foundations and general constr., (2) heating and ventilating (3) electrical work (4) plumbing (A) Martin Van Buren Houses, Proj. No. NYC-30, area bounded generally by Trinity Ave., E. 161 St., E. 163 St. and lines generally parallel respectively to E. 161 St. and to Trinity Ave. (B) Forest South Houses Proj. No. NY-5-31 in area bounded generally by Tinton Ave., E. 161 St., E. 163 St. and lines generally parallel respectively E. 161 St. and to Tinton Ave. (C) for combination of both Projects NYC-30 and NYC-31. Plans deposit $75. Extended date. CD 5/26.

BUILDINGS—SLC

▲ Pa., **Essington** — SUPERSTRUCTURE — Scott Paper Co., Front and Market Sts., Chester, soon lets contract superstructure for office, laboratory, parking and site preparation. Total est. $10,000,000. Welton Becket & Assoc. and Murray Ettrick Assocs., 8657 Wilshire Blvd., Los Angeles, Calif., archts.-engrs. CD 5/22.

HEAVY CONSTRUCTION—LB & CA

▲† **Oman-Farnsworth-Wright,** 625 Madison Ave., New York, N. Y., CA **$1,685,497**, buildings and airfield facilities, [illegible] Lajes Field, AZORES. U. S. Eng., 465 Broadway, New York 13, N. Y. Bids May 7. CD 4/9.

▲ **Gull Contg. Co. Inc.,** 31-15 Lawrence St., Flushing, N. Y., LB **$1,992,760** (5 bidders), Sections 5 and 6 of approach roadway sys. in New York for upper level expansion of George Washington Bridge. Contr. GWB-190.000, NEW YORK and NEW JERSEY. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids June 9. CD 6/4.

▲ **Yuba Consolidated Industries,** 37 Mohawk, Buffalo 12, N. Y., LB **$2,114,547**, superstructure work on Ohio St. Bridge, BUFFALO, N. Y. City, City Hall, Buffalo 2, N. Y. Bids June 4. CD 5/27.

▲ **PENNSYLVANIA** — Pa. Hwys. & Bridge Auth., 506 North Office Bldg., Harrisburg.

F. A. Canuso & Sons, Inc., 123 W. Roosevelt Blvd., Phila., Pa., CA **$1,342,505**, [illegible] width Proj. 739-3 [illegible] Newtown, Marple, Haverford and Upper Darby Twps. Bids May 22. CD 5/27, under LB.

† **H. I. Lewis Constr. Co.,** Middletown, Pa., CA **$698,992**, [illegible] Shop Bldg. No. 137, Olmsted Air Force Base, ENG-36-030-59-311, MIDDLETOWN, PA. U. S. Eng., 28th St. and Maryland Ave., Baltimore, Md. [illegible], 1200 N. Broad St., Phila. [illegible]. CD 6/9.

▲ **C. J. Langenfelder & Sons,** 8427 Pulaski Hwy., Baltimore, Md., CA **$1,397,551**, Contr. No. 2, Patapsco Expressway, TOWSON, MD. Baltimore Co. Revenue Auth., 400 County Office Bldg., Towson 4, Md. Bids May 19. CD 5/22.

▲ **McCloskey Co.,** 1620 West Thompson St., Phila., Pa., CA **$3,290,854**, Twelfth St. Expressway, 12th St. to Constitution Ave., WASH., D. C. D. C. Government, Dept. Highways, 499 Pa. Ave., Wash., D. C. Bids May 26. CD 5/27, under LB.

▲ **DELAWARE** — State Hy. Dept., Hy. Admin. Bldg., Dover.

Del. **Burger Constr. Co.,** Walker Rd. and Railroad Ave., Dover, Del., CA **$844,701**, 7 span steel concrete Bridge No. 16, Farnhurst Interchange, FAI-1, Delaware Memorial-Maryland Freeway.

Del. **G. A. & F. C. Wagman, Inc.,** 370 E. Main St., Dallastown, Pa., CA **$1,851,365**, 4 bridges, 7-East, 7-West, and 8-East and 8-West spanning Pennsylvania R.R. tracks at Farnhurst Interchange. Bids May 20. CD 5/22, under LB.

BUILDINGS—LB & CA

Parkview Estates, c/o Ackerman, Harris & Wolff, Jericho Turnpike, Commack, N. Y., Owner Builds, **$600,000**, (addnl. section) 50 HOUSES, Brentwood Rd. between Commack and Candlewood Rds., BRENTWOOD, N. Y.

Westwood Manor Homes, c/o Nassau Suffolk Realty Corp., 105 Grand Ave., Massapequa, N. Y., Owner Builds, **$650,000**, 50 HOUSES, Brentwood Rd., BRENTWOOD, N. Y.

Valmont Homes, c/o Butterly & Green, Inc., 168-25 Hillside Ave., Jamaica, N. Y., Owner Builds, **$650,000** (addnl. section) 50 HOUSES, Jericho Turnpike and Larkfield Rd., COMMACK, N. Y.

Julius Carter, c/o Michael W. Frudakis, archt., 185 Montague St., Brooklyn 2, N. Y., Owner Builds, **$800,000**, 6 story APARTMENT and COMMUNITY CENTER, JAMAICA, N. Y. CD 3/2.

Millwood Park Homes, c/o Twentieth Century Homes, 168-10 Hillside Ave., Jamaica, N. Y., Owner Builds, **$600,000** (second section), 30 HOUSES, Merrick Rd. and Redwood Lane, MASSAPEQUA, N. Y.

Cortland Operating Co., c/o Samuel Paul, archt., 89-51 164th St., Jamaica, N. Y., Owner Builds, **$800,000**, 12 story APARTMENT, west side of Brooklyn Blvd., south of Burke Ave., NEW YORK, N. Y. CD 3/2.

▲ **Malan-Dean Corp.,** 2 Park Ave., New York 16, N. Y., Owner Builds, **$3,000,000**, 20 story APARTMENT, 1189-99 First Ave., NEW YORK, N. Y. Sylvan Bien, 342 Madison Ave., New York 17, N. Y., archts. CD 2/20.

Syosset Woods Homes, c/o Henry A. Kia Realty Co., 165 Hempstead Turnpike, West Hempstead, N. Y., Owner Builds, **$600,000** (2nd section) 25 HOUSES, Jericho Turnpike east of South Oyster Bay Rd., SYOSSET, N. Y.

▲ **Hillside Farms,** c/o Max Uden, Rte. 130, and Norwood Ave., Pennsauken, N. J., Separate Contracts, **$4,800,000**, 400-unit RESIDENTIAL DEVELOPMENT, Haddonfield-Berlin Rd., etc., HADDONFIELD, N. J. Herbert V. Kolosky, Cress Blvd. and Norwood Ave., Pennsauken, N. J., archt.

▲ **Lawrenceville Manor,** c/o Mike Reback, 10 Walton Rd., Mount Holly, N. J., Separate Contracts, **$3,000,000**, 200 unit RESIDENTIAL DEVELOPMENT, Darrah Lane, etc., PRINCETON, N. J. Isadore Naftali, 112 High St., Newark, N. J., archt.

▲ **Raymond L. Corper,** Ambler, Pa., Separate Contracts, **$1,725,000**, RESIDENTIAL DEVELOPMENT (115), Welsh Rd., etc., AMBLER, PA.

▲ **Spring Constr. Co.,** 801 Spring Ave., Elkins Park, Pa., Separate Contracts, **$2,400,000**, RESIDENTIAL DEVELOPMENT (160), Limekiln Pike, etc., AMBLER, PA. Henry S. Berg, 1411 Walnut St., Phila., Pa., archt.

▲ **E. J. Frankel Assocs.,** Parkway House, Phila., Pa., Separate Contracts, **$1,500,000**, 210 units MOTOR HOTEL, City Line Ave., BALA CYNWYD, PA. Thalheimer & Weitz, 1315 Walnut St., Phila., Pa., archts.

▲ **Gallagher Constr. Co.,** 690 Burmont Rd., Drexel Hill, Pa., CA **$1,200,000**, RESIDENTIAL DEVELOPMENT, 590 [illegible] Rd., etc., DREXEL HILL, PA. Garbor [illegible], archt.

Gladwyne Homes, Inc., Black Hill Rd., Gladwyne, Pa., Separate Contracts, over **$900,000**, RESIDENTIAL DEVELOPMENT, Black Hill Rd., etc., GLADWYNE, PA.

▲ **William F. Sutter,** Newspeak, Pa., LB **$1,061,900** (10 bidders), general constr., Southern SENIOR HIGH SCHOOL for Derry Area Jt. School Bd. Proj., [illegible] LATROBE, PA. Pa. Pub. School Bldg. Auth., [illegible] 2nd St., Harrisburg, Pa. Bids June 4. CD 5/13.

Samson Constr. Co., 5434 York Ave., Baltimore, Md., Separate Contracts, **$401,000**, 12 DWELLINGS, 5900 Block Frey Ave., BALTIMORE, MD.

Wildberger Best Constr. Co., 2025 E. North Ave., Baltimore 13, Md., LB **$652,460**, est. $800,000, 7 bidders, 1 and 2 story brick concrete HEALTH DEPARTMENT DISTRICT BLDG., North Ave. and Washington St., BALTIMORE, MD. City, Bureau Bldg. Constr., 312 Municipal Bldg., Baltimore 2, Md. Bids June 3. CD 5/22.

▲ **Lacchi Constr. Co.,** 2021 Maryland Ave., Baltimore, Md., LB **$1,153,500**, TEMPLE SHRINE, BALTIMORE, MD. Boumi Temple Corp., 3001 N. Charles St., Baltimore, Md. CD 1/28.

▲ † **Dean Constr. Co.,** 630 3rd Ave., New York, N. Y., CA **$1,465,000**, OPERATING FACILITIES (steam, electric and distribution) at National Institutes of Health, BETHESDA, MD. General Services Admin., 19th and F Sts., N.W., Wash. 25, D. C. Bids May 26. CD 6/1, under LB.

▲ **Standard Constr. Co.,** 1000 Connecticut Ave., N.W., Wash., D. C., CA **$3,000,000**, 12 story OFFICE BLDG., 1730 K St., N.W., WASH., D. C. A. Bennett, Charles Kaplan & Bernard Gelwiz, 1000 Connecticut Ave., N.W., Wash., D. C. Corning & Moore, 1302 18 St., N.W., Wash., D. C., archt.

Cargill Inc., Seaford, Del., Separate Contracts, **$115,000**, FEED MILL expansion, SEAFORD, DEL.

D & V Masonry Constr. Co., Elsmere, Del., Separate Contracts, **$400,000**, RESIDENTIAL DEVELOPMENT, Frenwick Rd., etc., STANTON, DEL.

Devonshire Homes, Inc., 2-11 Concord Pike, Wilmington, Del., Separate Contracts, **$450,000**, RESIDENTIAL DEVELOPMENT (24), Concord Pike, etc., TALLEYVILLE, DEL.

SOUTH

† Va., **Lynchburg** — MARINE CORPS RESERVE TRAINING CENTER — BA 6/29 — Dist. P. Wks. Office, 5th Naval Dist., Room 307, Bldg. N-26, U. S. Naval Base, Norfolk 11, Marine Corps Reserve Training Center, NBy 20494, Spec. 20494/59. $250,000-$500,000.

Ga., **Sandersville** — HOSPITAL — BA 7/7 — Washington Co. Hospital Auth., 65 bed hospital. $750,000-$800,000. Plans deposit $70. Thomas & Hutton, 20 E. Bay St., Savannah, archts. CD 9/26/57.

HEAVY CONSTRUCTION—LB & CA

▲ **NORTH CAROLINA** — State Hy. Comn., Raleigh.

N. C. **Nello L. Teer Co.,** Box 1131, Durham, N. C., CA **$3,828,693**, CABC, concrete pavement and rest station, 18.1 mi., Interstate 85 between Henderson and point on U. S. 1 near Virginia State Line. Proj. 8.14951-I-85-4 (11) 214 F-701 (4), Vance and Warren Counties.

N. C. **W. L. Coston & Son,** First National Bldg., Birmingham 3, Ala., CA **$1,039,727**, CABC and 9 in. concrete pavement and rest station 4.5 mi. Interstate 85 from Charlotte By-Pass to NC 273, west of Catawba River. Proj. 8.162571-85(8) 26, Mecklenburg and Gaston Counties. Bids May 26, awarded June 4. CD 6/2, under LB.

▲ **Lee Constr. Co.,** 311 W. Worthington St., Charlotte, N. C., LB **$608,366**, sanitary sewer improv., Contr. 2, sewage treatment plant, MOUNT AIRY, N. C. City, City Hall, Mount Airy, N. C. Bids June 2. CD 5/8.

Gilbert Eng. Co., 638 S. Meeting St., Statesville, N. C., LB **$564,700**, Contr. 1, outfall sewers (Mount Airy, N. C.).

H. W. Hunter, P.O. Box 1391, Lakeland, Fla., LB **$788,638**, storm sewers, BRADENTON, FLA. City, City Hall, Bradenton, Fla. Bids June 4. CD 5/18.

W. L. Cobb Const. Co., P.O. Box 10309, St. Petersburg, Fla., LB **$609,874**, E. W. and N. S. Runways, St. Petersburg-Clearwater International Airport, CLEARWATER, FLA. Bd. Comrs. Pinellas Co., 305 Haven St., Clearwater, Fla. Bids June 5.

† **Diversified Builders,** Cocoa Beach, Fla., CA **$819,400**, blockhouse for Sutton Missile, Cape Canaveral, Patrick Air Force Base, COCOA, FLA. U. S. Eng., 575 Riverside Ave., Jacksonville 2, Fla. CD 6/10.

† **Paul Smith Constr. Co.,** 4936 Kuhl Ave., Orlando, Fla., CA **$529,065**, installation engineer facility, NCO open mess addn., pavement and grounds bldg., Cape Canaveral Air Force Missile Test Center, Patrick Air Force Base, Inv. No. ENG-08-123-59-64, COCOA, FLA. U. S. Eng., 575 Riverside Ave., Jacksonville 2, Fla. Bids May 28. CD 6/4, under LB.

† **Boyd & Goforth, Inc.,** Box 12436, Charlotte, N. C., LB **$409,089**, est. $457,582, drone target facility, Guidance station, Pilotless Aircraft, MacDill Air Force Base, TAMPA, FLA. U. S. Eng., Box 4970, Jacksonville 1, Fla. Bids June 2. CD 4/29.

▲† **Madden Constr. Co. Inc.,** Bossier City, La., CA **$3,239,360**, 469 housing units addns., alterations, Maxwell Air Force Base and Gunter Air Force Base, MONTGOMERY, ALA. Procurement Office, Maxwell Air Force Base, Montgomery, Ala. Bids Apr. 9. CD 2/27 and 3/2.

▲ **LOUISIANA** — State Dept. Hys., Rm. 307, Hy. Office Bldg., Baton Rouge.

R. B. Potashnick Const. Co., Box 323, Cape Girardeau, Mo., CA **$5,932,054**, drainage structures and related work, 8.088 mi., Little Woods-Pontchartrain Bridge, Hy. Rte. I-10, SP No. 450-01-02, FAP No. I-10-5(6) 250, Orleans Parish. Bids Apr. 22. CD 4/27, under LB.

Frye Engineering Co., Frankfort, Ky., CA **$670,970**, Contr. 2, raw pumping station, water treatment facilities and expansion water treatment plant, WINCHESTER, KY. City Water Dept., Winchester, Ky. CD 5/26, under LB.

BUILDINGS—LB & CA

Little Constr. Co., P.O. Box 1084, Charlotte, N. C., CA **$600,000**, BOWLING ALLEY, CHARLOTTE, N. C. [illegible], 612 N. Howard St., Baltimore, Md.

Charles J. Craig Constr. Co., 1610 Westminster St., [illegible] **$496,960**, free LIBRARY, CHARLESTON, S. C. Charleston County Council, [illegible] Charleston, S. C. Bids June 2. CD 5/8.

▲ **Dyson & Co.,** Box 22, Pensacola, Fla., LB **$1,664,400**, Escambia General HOSPITAL, PENSACOLA, FLA. Bd. Comrs. Escambia County, Courthouse, Pensacola, Fla. Bids June 3. CD 5/16.

Milbrand Building Corp., 4215 N. Ocean Blvd., Fort Lauderdale, Fla., CA approx. **$400,000**, 3 and 4 story, [illegible] 270 [illegible] HOTEL, Satellite, 1450 N. Ocean Blvd., POMPANO BEACH, FLA. Otto Milbrand, 1450 N. Ocean Blvd., Pompano Beach, Fla. [illegible] A. Petersen, 226 Basin Dr., Fort Lauderdale by the Sea, Fla., archt. [illegible] H. S. Smith, Box 3871, Sarasota, Fla., engr.

Dyson Building Co., Fairhope, Ala., LB **$402,280**, [illegible] HOSPITAL, FAIRHOPE, ALA. Bd. Trustees Thomas Hospital, Fairhope, Ala. Bids May 29. CD 5/22.

▲ **G. E. Bass & Co. Inc.,** Box 1033, Jackson, Miss., LB **$1,326,030**, low rent HOUSING, Ala. 68-1, 68-4, SHEFFIELD, ALA. Sheffield Housing Auth., Sheffield, Ala. Bids June 3. CD 5/15.

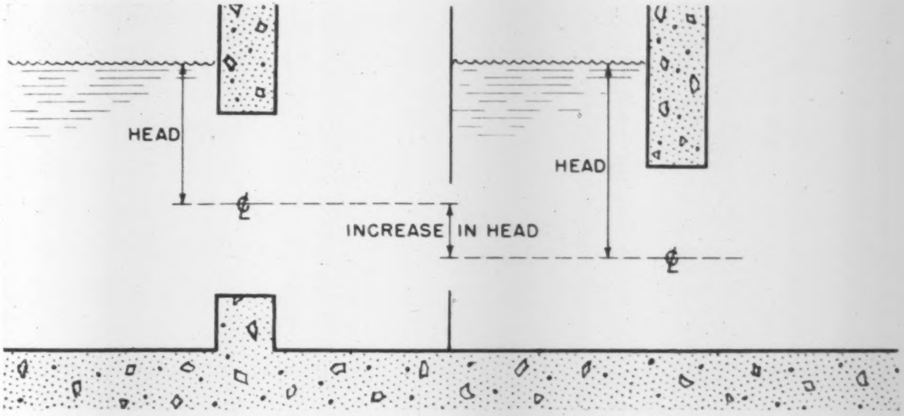
▲† **J. A. Jones Constr. Co.,** 1605 Hayes St., Nashville, Tenn., LB **$8,450,000** (11 bidders), GM & S HOSPITAL and REGIONAL OFFICE BLDG. NO. 1, Veterans Administration Center, JACKSON, MISS. Veterans

(Continued on page 263)

#4

HY-Q®
Sluice Gates Assure Maximum Hydraulic Gradient

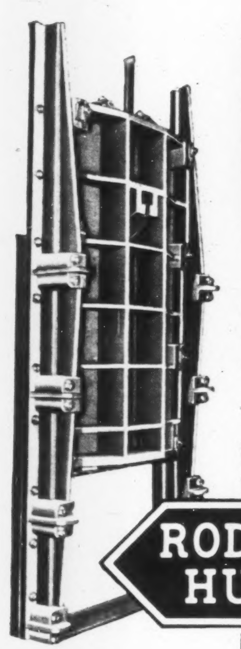
SPECIFY RODNEY HUNT
HY-Q SLUICE GATES WITH FLUSH-BOTTOM CLOSURE
and get these **6** design advantages

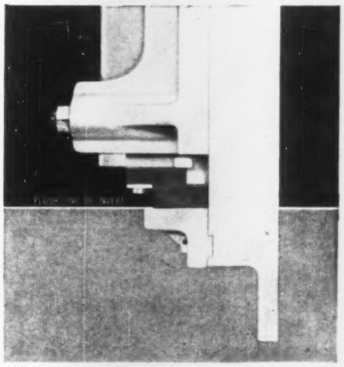


In most water control projects—especially in filtration and sewage treatment plants—every fraction of a foot of head is of great importance. With the conventional sluice gate (left of diagram) the raised sill means a sacrifice in pressure. The Rodney Hunt HY-Q Sluice Gate installed flush with the invert (right of diagram) fully utilizes every inch of effective head available to provide greater discharge.

The many advantages of the Rodney Hunt HY-Q Sluice Gate derive from the design of the resilient seal fastened to the bottom of the disc as illustrated at the left. This seal extends the full width of the disc and provides a cushioned closing at the stop bar *flush with the invert*. This flush-bottom closure assures—**1.** maximum flow — **2.** complete drainage without pumps or piping—**3.** elimination of silt and debris problems—**4.** maximum hydraulic gradient—**5.** lowest possible invert—and—**6.** construction economy.

In brief, the HY-Q gate offers unmatched design flexibility and construction economy for water control projects...with hundreds of gate sizes available from 6" x 6" to 144" x 144" and larger to meet your specific design requirements.





HY-Q The sluice gate with flush-bottom closure

RODNEY
HUNT

HY-Q SLUICE GATE
a product of
RODNEY HUNT MACHINE CO.
Water Control Equipment Division
85 Water Street, Orange, Mass.
Serving water control engineers with equipment and engineering

New steels are
born at
Armco

New appearance and usefulness at a fraction of new-building cost

Here's another practical, economical application of Sheffield Welded Wire Fabric. Another use for the "backbone of steel" that Sheffield puts in highways and other slab construction.

This church had seen better days. Question: build a new one, or renovate the existing structure?

Decision: remove loose mortar and brick. Then give the building a new exterior and interior with Gunite applied on Sheffield Welded Wire Fabric.

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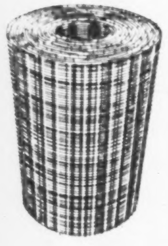

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(Continued from page 260)

Admin., Munitions Bldg., Wash., D. C. Bids June 9. CD 4 7

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ Ill., **Chicago**—BA 6 25—City, City Hall, grading, paving from Ogden Ave. to Division approx. ¾ mi. Northwest Super Highway. $1,200,000. CD 2 4

O. **Cleveland**—BA 6 25—Comrs. Cuyahoga County, Rm. 451, County Admin. Bldg., 1219 Ontario, Zone 13, imprv. Green Rd. from Kinsman south to Miles Rd., Beachwood and Warrensville Heights. $971,000. Plans deposit $100. Albert S. Porter, Standard Bldg., co. engr. CD 11 11.

BUILDINGS—BA

Ill., **Maywood**—SUPPLY DEPOT—BA 6 30—U. S. Veterans Admin., Vermont Ave., between H and I Sts. N.W., Wash. 25, D. C. 1 story, 30,000 sq. ft. supply depot remodeling. $500,000. Schmidt, Garden & Erickson, 104 S. Michigan Ave., Chicago, Zone 3, archts.

HEAVY CONSTRUCTION—LB & CA

A. W. Burns & Sons Constr. Co., 424 Woodland Ave., Columbus, O. LB $886,884 (9 bidders) trunk sanitary sewer between Henderson R. and Worthington city limits along Olentangy River, COLUMBUS, O. City, City Hall, Columbus, O. Bids June 2. CD 8 20 '54.

Rodgers Constr. Co., 214 McAdams Bldg., Springfield, O. LB $415,839 (est. $414,839) (3 bidders) 3 story 41 x 207 ft. brick, reinforced airmen's dormitory, Wright Patterson Air Force Base, ENG-15-029-59-60. DAYTON, O. U. S. Engrs., R. [illegible], Box 59, Louisville 1, Ky. Bids June 2. CD 4 29.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield. Bids opened 6 5.

—E. T. Simonds, Carbondale, Ill., and J. D. Barter Co., Harrisburg, Ill., LB $1,290,905 (5 bidders) 2 grade separations FA 1-57 over FA 592b and 2 bridges near Dongola, Union Co.; LB $98,979 (4 bidders) grade separation county road over FA 1-4 SW of Marion, Williamson Co.;

—M. J. Boyle & Co., 2480 Estes Ave., Chicago, Ill., LB $195,981 (8 bidders), grade separation carry Orchard Rd. over US 66 north of Lockport, Du Page Co.;

—Central Eng. Co., P. O. Box 848, Davenport, Iowa, LB $134,754 (3 bidders) 2 bridges FA 1-6 over Shaffer Creek east of Milan, Rock Island Co.;

—A. J. Walker Co., 421 South 21 St., Mattoon, Ill., LB $425,567 (2 bidders), 2 bridges on Ill. 121 between Toledo and Greenup, Cumberland Co.;

—Wendnagel & Co., 600 W. Cermak St., Chicago, Ill., LB $100,456 (11 bidders) furnish steel for bridge on Ill. 31 SW of Montgomery, Kendall Co.;

—J. P. Wetherby Co., 1016 W. Superior St., Ottawa, Ill., LB $244,802 (5 bidders) bridge and paving on Ill. 23 north of Ottawa, La Salle Co. CD 5 28.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield. Bids opened 6 5.

—Culberson Constr. Co., Paris, Ill., LB $457,899 (2 bidders) 2 bridges FA 1-64 over ditches east of Lawrenceville, Lawrence Co.; LB $397,290 (6 bidders) grade separation US 150 over FA 1-74 west of Danville, Vermilion Co.;

—H. H. Mass Constr. Co., Huntley Rd., Algonquin, Ill., LB $179,618 (4 bidders) railroad subway Peoria and Western R.R. over FA 135 west of Danville, Vermilion Co. CD 6 1.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield. Bids opened 6 5.

—Culberson Constr. Co., Paris, Ill., LB $397,290 (4 bidders) grade separation SA 15 over FA 1-5 north of Oakwood, Vermilion Co.; LB $310,303 (7 bidders) 2 bridges over Vermilion River 4 mi. west of Danville, Vermilion Co.;

—E. T. Simonds, Carbondale, Ill., and J. D. Barter, Harrisburg, Ill., LB $133,656 (4 bidders) grade separation over FFA 1-4 north of Dongola, Union Co.; LB $111,755 (5 bidders), grade separation structures FA 1-4 over FA 5923 at Lick Creek, Union Co.;

—Calhoun County Contr. Co., P.O. Box 201, Springfield, Ill., LB $254,594 (4 bidders), bridge over Macoupin Creek on Ill. 5, SE of Carlinville, Macoupin Co.;

—R. A. Cullinan & Son, Tremont, Ill., LB $316,485 (1 bidder) 2 grade separation structures FA 1-74 over A.T. and Santa Fe NE of Morton, Tazewell Co.;

—R. B. Potashnick & Reginhardt Constr. Co., Cape Girardeau, Mo., LB $788,309 (4 bidders) 2 grade separation structures FA 1-57 over FA 5911 near Lick Creek, Union Co.;

—Shappert Eng. Co., Belvidere, Ill., LB $119,432 (2 bidders) widen 2 bridges over Rush Creek on Ill. 80 north of Savanna, Carroll Co.;

—Stephens Ready Mix Co., 216 10 St., Cairo, Ill., LB $136,926 (2 bidders) superstructure over Main Ditch on US 45 N.W. of Mermet, Massac Co.;

—E. H. Swenson & Son, 14 Henderson Ave., Joliet, Ill., LB $245,788 (7 bidders) railroad grade separation FA 19 over CB & Q R.R. on Ill. 31 SW of Montgomery, Kendall Co.;

—Wendnagel & Co., 600 W. Cermak St., Chicago, Ill., LB $113,395 (12 bidders) furnish steel for 2 bridges over Vermilion River, Vermilion Co. CD 5 22.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield. Bids opened 6 5.

—Fruin-Colnon Contg. Co., 1706 Olive St., St. Louis, Mo., LB $1,243,110 (3 bidders) storm sewer for E. St. Louis Expressway in E. St. Louis, St. Clair Co.;

—Powers-Thompson Co., 2750 Chicago St., Joliet, Ill., LB $3,511,009 (7 bidders) paving, bridge, grade separation 7.56 mi. on FA 1-80 near Minooka, Grundy and Kendall Counties.

—Leon B. Stilley Co., Marion, Ill., LB $1,261,066 (6 bidders) paving and grade separation 2.86 mi. FA 57 over FA 1-4 SW of Marion, Williamson Co.

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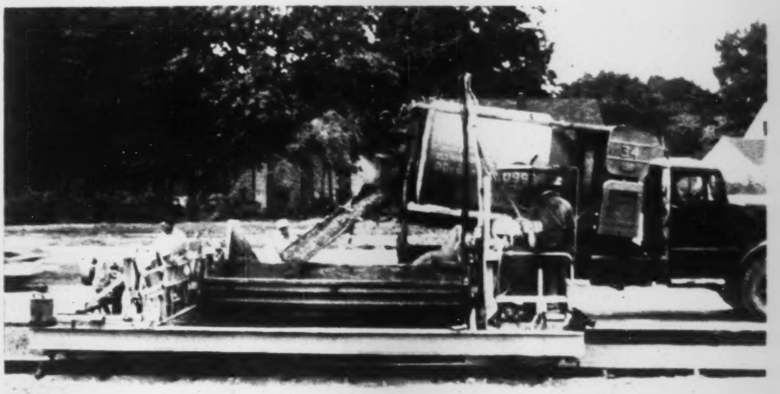

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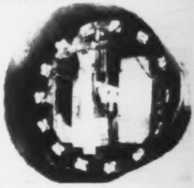

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Ill.—Charles [illegible] & Co., R.R. 1, Rockford, Ill., LB $933,807 (2 bidders), paving and resurf. 2.67 mi. US 20 near Rockford, Winnebago Co.

Ill.—R. A. Cullinan & Son, Tremont, Ill., LB $152,732 (1 bidder), base course 5.87 mi. FA S 470 east of Washington, Tazewell Co.

Ill.—Geo. H. Hartong, Inc., 340 Sherwood Court, La Grange Park, Ill., LB $138,572 (4 bidders), patching and surf. 6.50 mi. S.B. 140 near Cave in Rock, Gallatin and Hardin Counties.

Ill.—J. P. Hollerich & Co., P.O. 214, La Salle, Ill., LB $96,247 (2 bidders), resurf. 0.45 mi. Ill. Rte. 88 in Milledgeville, Carroll Co.

Ill.—Ladd Constr. Co., Ladd, Ill., LB $332,254 (2 bidders), wid'n. and resurf. SB 1-2 Galena Ave. [illegible] Lee Co.

Ill.—Parro Constr. Corp. and McMahan Illinois Corp., 604 W. John St., Urbana, Ill., LB $176,297 (2 bidders), resurf. US 36 from [illegible], Douglas and Edgar Counties.

Ill.—Sangamo Constr. Co., 2802 N. MacArthur Rd., Springfield, Ill., LB $530,578 (4 bidders), [illegible] US 67 near White Hall, Greene Co.

Ill.—E. T. Simonds Co., Carbondale, Ill., and J. D. Barter Co., Harrisburg, Ill., LB $485,971 (4 bidders), paving 1.24 mi. on FA 1-57 and interchange at Dongola, Union Co. CD 5/28.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield. Bids opened 6/5.

Ill.—R. A. Cullinan & Son, Tremont, Ill., LB $248,035 (2 bidders), wid'n. and resurf. US 150 south of Dry Creek, Tazewell and Woodford Counties; LB $87,145 (3 bidders), base course 4.51 mi. FA S 572 east of Kilbourne, Mason Co.

Ill.—Mount Carmel Sand & Gravel Co., Mount Carmel, Ill., LB $217,890 (1 bidder), surf. 3.64 mi. FA S 808 near Lancaster, Wabash Co.; LB $102,326 (1 bidder), surf. 1.79 mi. FA S 860 west of West Salem, Edwards Co.

Ill.—Ninora Constr. Co., 139 E. Van Buren, Joliet, Ill., LB $545,096 (4 bidders), base course and resurf. 5.42 mi. Mason City to US 136 on Ill. 29, Mason Co.; LB $198,606 (6 bidders), base course and resurf. Ill. 121 near Warrensburg, Logan and Macon Counties.

Ill.—Sjostrom Paving Co., 1718 Seventh Ave., Rockford, Ill., LB $988,995 (1 bidder), paving 3.81 mi. US 20 west of Rockford, Winnebago Co.; LB $241,612 (3 bidders), paving 0.71 mi. FA S 1044 [illegible] east of Rockford, Winnebago Co.

Ill.—Swords & Dietz, 107 So. Jefferson, Peoria, Ill., LB $287,411 (6 bidders), surf. course 6.97 mi. from west of [illegible], Henry Co.; LB $91,855 (2 bidders), base course 3.44 mi. FA S 1357 from North Hampton N.E., Peoria Co.

Ill.—E. T. Simonds, Carbondale, Ill., and J. D. Barter Co., Harrisburg, Ill., LB $3,631,319 (6 bidders), paving and interchange 4.11 mi. FA 1-57 near Lick Creek, Johnson and Union Counties.

Ill.—Bituminous Fuel & Oil, [illegible] Illinois Ave., East St. Louis, Mo., and Franklin Asphalt Co., Benton, Ill., LB $426,024, (4 bidders), resurf. US 51 in DuQuoin, Perry Co.

Ill.—Brown & Lambrecht Earthmovers, Inc., 333 S. Chicago, Joliet, Ill., LB $420,608, (4 bidders), [illegible] 5.47 mi. frontage roads on US 66 SW of Wilmington, Will Co.

Ill.—Cataphote Corp., 2509 Adams St., Toledo, O., LB $126,669, (2 bidders), pavement marking in [illegible] districts, Statewide.

Ill.—Coggeshall Constr. Co., Clayton, Ill., LB $161,485, (4 bidders), paving 4.65 mi. FA 60 from Mount Sterling to county line, Brown and Pike Counties.

Ill.—Gunther Constr. Co., 800 E. Main St., Galesburg, Ill., LB $137,161, (3 bidders), resurf. US 67 in Monmouth, Warren Co.

Ill.—L & S Constr. Co., 5317 W. [illegible] St., Chicago, Ill., LB $108,330, (2 bidders), furnish, install 12 traffic control signals west of Chicago, Cook Co.

Ill.—I. D. Lain Co., 1901 E. Adams St., Springfield, Ill., LB $347,908 (4 bidders), wid'n. 1.17 mi. US 36 and 54 in Jacksonville, Morgan Co.

Ill.—Litchfield Bituminous Co., Hillsboro, Ill., LB $143,823, (3 bidders), base course and bridge 2.41 mi. FA S 228 near Walshville, Montgomery Co.

Ill.—R. T. Madden Co., Janesville, Wis., LB $273,652 (2 bidders), paving 1.90 mi. Ill. 26 in Cedarville, Stephenson Co.

Ill.—Monmouth Stone Co., 521 S. 3 St., Monmouth, Ill., LB $353,822, (2 bidders), wid'n. US 67 in Monmouth, Warren Co.

Ill.—Orr Constr. Co., 27 E. 19 Place, Chicago Heights, Ill., LB $615,750, (4 bidders), paving and [illegible] subway on FA 1-57 and C. B. & Q. R. R., [illegible] Co.

Ill.—C. H. Rumberg, Fairfield, Ill., LB $116,234 (4 bidders), surf. course 3.12 mi. FA S 795 north of [illegible], Wayne Co.

Ill.—Seneca Petro. Co., 339 W. 33 St., Chicago, Ill., LB $149,848, (3 bidders), surf. 8.64 mi. from SW of Princeville, Peoria Co. CD 5/22.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield. Bids opened 6/5.

Ill.—McCalman Constr. Co., 619 Sexton St., Danville, Ill., LB $2,752,668, (4 bidders), paving 5.66 mi. FA 1-74 west of Danville, Vermilion Co.

Ill.—McDougal-Hartmann Co., 4100 N. Adams St., Peoria, Ill., LB $2,543,066, (7 bidders), paving and grade separation 6.47 mi. on FA 44 from Harristown to Decatur, Macon Co.

Ill.—Bishop Burd & H. K. Truck Service, [illegible], Ill., LB $209,515, wid'n. US [illegible] northwest of Metropolis, Massac Co.

Ill.—Freesen Bros., Bluffs, and Thomas Quarry, Winchester, Ill., LB $132,418 (4 bidders), surf. 3.17 mi. FA 155 from interchange US 36 and 54 south, Scott and Greene Counties.

(Continued on page 266)

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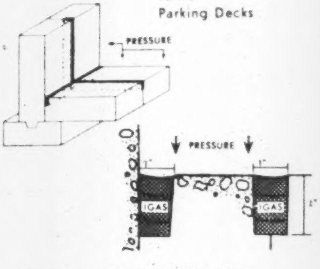
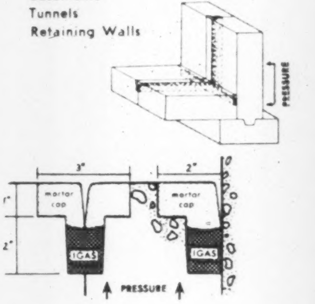


TYPE B — BACK PRESSURE

Basements
Tunnels
Retaining Walls



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26-31

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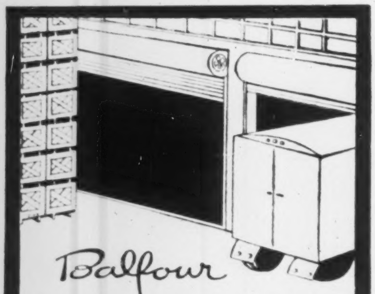

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(Continued from page 264)

Ill.—Johnston Roadbuilders & Star Eng. Co., 150 Easton St., Joliet, Ill., LB **$138,625,** (2 bidders), resurf. 8.45 mi. on US 45 from county line to SE of Mermet, Massac Co.;

Ill.—E. T. Simonds, Carbondale, Ill., and J. D. Barter Co., Harrisburg, Ill., LB **$829,774,** (2 bidders), widen and bridge on SB 1-1 (US 45) SE of Mermet, Massac Co. CD 6/1.

▲ Sterling Drugs, Inc., 1450 Broadway, New York, N. Y., LB **$1,187,000** (1 bidder), Sewerage Div. YY, west air oxidation process west Southwest Sewage Treatment Works, 200 tons a day cap. CHICAGO, ILL. Metropolitan Sanitary Dist. of Greater Chicago, 100 E. Erie St., Chicago, Ill. Bids June 4. (Correction—Low Bid Cost) CD 6/8, under LB.

M. J. Boyle & Co., 2519 N. Elston Ave., Chicago, Ill., LB **$449,766,** est. $500,000 (11 bidders), Fulton St. Highway Bridge, concrete, Northwest Expressway and Fulton St., 0202.2 25 B, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago, Ill. Bids June 5. CD 5/27.

▲ H. H. Hall Constr. Co., 211 S. 15 St., East St. Louis, Ill., LB **$1,871,227,** (3 bidders), Sec. 1-Z bridge approaches to East St. Louis Expressway along 3rd St. between Illinois and Missouri Ave. connecting expressway with Veterans' Memorial Bridge, EAST ST. LOUIS, ILL. City, City Hall, East St. Louis, Ill. H. W. Lochner, Inc., 1408 E. 72 St., Chicago, Ill., engr. David J. Johnston, 129 N. 3 St., East St. Louis, Ill., city engr. Bids June 3.

▲ Boncar Constr. Co., 11808 S. Halsted St., Chicago, Ill., CA **$1,290,722,** Flagg Creek storm sewers Divs. 2A, 3 and 4, HINSDALE, ILL. City, City Hall, Hinsdale, Ill. Bids Apr. 21, awarded June 4. CD 5/21, under LB.

▲ J. L. Simmons Co., Inc., 506 S. Wabash Ave., Chicago 5, Ill., CA **$2,932,730,** aeration tanks, North Side Sewage Treatment Plant, Skokie, CHICAGO, ILL. Metropolitan Sanitary Dist. of Chicago, 100 E. Erie St., Chicago, Ill. Bids May 21, awarded June 4. CD 5/27, under LB.

BUILDINGS—LB & CA

▲ Industrial Constr. Co., 10101 Meech Ave., Cleveland, O., CA Est. **$1,000,000** (10 bidders), 125,000 sq. ft. steel WAREHOUSE, Lee and Rockside Rds., Maple Heights, CLEVELAND, O. Jones & Laughlin Steel Warehouse Div., 545 W. McCarty St., Indianapolis, Ind. F. E. Burroughs & Assoc., 5420 N. College Ave., Indianapolis, Ind., engrs.

▲ Geo. Sheaf & Sons, 449 Neilston St., Columbus, O., LB **$1,035,150,** est. $1,408,796, Highway Department GARAGE and TESTING LABORATORY, Columbus State School Grounds, COLUMBUS, O. State, Dpt. P. Wks., State Dpts. Bldg., Columbus, O. CD 9/26.

Fireproof Constr., Inc., 880 W. Third Ave., Columbus, O. Owner Builds, **$750,000,** APARTMENT incl. 100-car garage, northwest corner S. High and Blenkner Sts., COLUMBUS, O. Erwin Rossbach, 1527 Hawthorn, Columbus, O., engr. CD 6/10.

▲ Huber Homes, Inc., 5150 Fishburg Rd., Dayton, O. Owner Builds, **$15,000,000,** 25,000 unit HOUSING DEVELOPMENT, Wayne Twp., Fishburg Rd. to US Rte. 40 between Old Troy Park and Brandt Pike, DAYTON, O.

▲ Combs Homes, 3824 Wilmington Pike, Dayton, O. Owner Builds, **$1,500,000,** 98 HOMES, Hempstead Rd. east of Marshall Rd., Kettering, DAYTON, O. CD 5/28.

▲† Terminal Constr. Co., P. O. Box 14, Dover, Del., CA **$8,677,750,** 536 Capehart HOUSING, Clinton County Air Force Base, IFB 33-625-59-12, WILMINGTON, O. Procurement Officer, Clinton County Air Force Base, Wilmington, O. Garriott & Pepinsky, Balke & Larson, 1701 5th St., Third Bank Bldg., Cincinnati, O., archts. Bids Apr. 30. CD 5/15, under LB.

▲ Krahl Constr. Co., 350 N. Clark St., Chicago 10, Ill., CA **$1,300,000,** 7-story, 20 x 60 ft. DEPARTMENT STORE SERVICE addn., CHICAGO, ILL. Chas. A. Stevens, 25 N. State St., Chicago 2, Ill. Awarded June 4. Rolfe Renouf, 220 S. Michigan Ave., Chicago 4, Ill., engr.

The Austin Co., 510 N. Dearborn St., Chicago 10, Ill., CA Est. **$500,000,** 1-story, 55,000 sq. ft. PLANT, Rte. 17, MATTOON, ILL. Associated Spring Corp., Bristol, Conn.

Peter W. Petersen, Inc., 176 [illegible] Court, Waukegan, Ill., CA **$700,000,** 2-story, 165 x 650 ft. MEDICAL CENTER, 1608-18 Grand Ave., 280-car park lot paving, WAUKEGAN, ILL. Medical Co-op. Bd. Directors, c/o Dr. G. H. Harrison, 307 Washington St., Waukegan, Ill. Awarded June 5. Holabird & Root, 180 N. Wabash Ave., Chicago 1, Ill., archts.

S. M. Byrne Constr. Co., 3100 W. Burleigh St., Milwaukee, Wis., CA Est. $400,000, CHURCH, MILWAUKEE, WIS. St. Theresa Catholic Congregation, 9525 W. Blue Mound Rd., Milwaukee, Wis. Awarded June 1959. Mark F. Pfaller Assocs., 7613 W. State St., Wauwatosa, Wis., archts.

Worden-Allen Co., 240 W. [illegible] Dr., Milwaukee, Wis. Owner Builds, **$500,000,** BANK AND OFFICE, MILWAUKEE, WIS. Marine National Bank, [illegible]

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

† Tex., Fort Hood—HOUSING IMPRVS.—BA About 6/25—U. S. Eng., Box 1229, Galveston, freeze damage repairs and alterations, permanent family housing, ENG-41-243-59-85. $100,000-$500,000. CD 9/8.

† S. D., Rapid City—EMERGENCY POWER PLANT, etc.—BA 7/7—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., emergency power plant and electrical distr., Ellsworth Air Force Base, ENG-25-066-59-149. $100,000-$500,000. CD 9/11.

† Oklahoma—BA 7/9—U. S. Eng., P. O. Box 61, Tulsa, trackwork for Frisco Railway at Keystone Reservoir, ENG-34-066-59-108. $500,000. CD 9/10.

(Continued on page 268)

(Advertisement)

Shooting for a fine break, 25,000 cubic yards of overburden were moved with fine fragmentation in this blast at a Bingham Canyon, Utah mine site. Nineteen 50-pound bags of Spencer N-IV Ammonium Nitrate were used in each of twelve holes, 63 feet deep—a total of 11,400 pounds of Spencer N-IV.

Record Rock-Moving Operation Uses New Spencer N-IV

No more trouble with leaking oil. Spencer N-IV is available in 50-lb. polyethylene plastic bags, so tough they reduce breakage as much as 50%. (Also available in 50, 80, and 100-lb. multiwall paper bags.)

Completely free-flowing, Spencer N-IV is used here at the rate of 0.5 pounds per cubic yard of rock in quartzite and from 0.8 to 0.9 pounds in limestone areas.

Efficient, low-cost ammonium nitrate gives greater blast energy on giant project:

Believed to be the biggest single rock-moving contract ever undertaken in the Utah area, Western Contracting Corporation's operation is set up to move 2,000 yards of overburden per hour! The job involves moving 8 million yards of quartzite and limestone overburden on the upper levels of the Bingham Canyon mine. By using Spencer N-IV Ammonium Nitrate, the contractor is able to speed up blasting, while keeping costs low. Made by Spencer Chemical Company, the uncoated N-IV produces more energy than commercial grade ammonium nitrates—yet costs no more!

No secondary blasting has been needed because Spencer N-IV gives such excellent fragmentation. Although the oversized equipment used on the job could easily handle large boulders, the contractor prefers a fine break to keep wear and tear on the machines to a minimum. Spencer N-IV produces its superior blast effect two ways:

(1) Spencer N-IV has a special structure which allows the prills to absorb oil more easily, and (2) Spencer N-IV contains a much higher percentage of ammonium nitrate than other brands. Another advantage of Spencer N-IV is that it reduces priming costs because it can be initiated with a single strand of 175-grain detonating cord. No need to attach additional material at intervals, and you put an end to the danger of storing high explosives on the job site!

For more information on new Spencer N-IV Ammonium Nitrate, write to Spencer Chemical Company, Industrial Chemicals Division, 407 Dwight Building, Kansas City 5, Mo.

CIRCLE N-4 READER SERVICE CARD

(Continued from page 266)

† **Tex., Lackland Air Force Base**—ELECTRIC POWER SYS—BA 7/9 U. S. Eng., Box 1229, Galveston, FPS 35/35 and electric power sys (P-75) ENG-41-243-59-76 $500,000-$1,000,000. CD 6/2

† **Missouri and Arkansas**—BA 7/14 U. S. Eng., P.O. Box 867, Little Rock, Ark., powerhouse and switchyard installation of Units 3 and 4, Table Rock Dam, White River, CIVENG-03-050-59-71B $500,000-$1,000,000. CD 6/8

BUILDINGS—BA

Minn., **Minneapolis**—MILLARD HALL IMPRVS.—BA 6/23 Regents of the University of Minnesota, 404 Administration Bldg., Zone 14, Millard Hall alterations, Phase III, Campus. $400,000. Plans deposit $25. C. H. Johnston, 715 Empire Bank Bldg., St. Paul, archt. CD 6/7/57

Minn., **Roseville (P. O. St. Paul)**—TERMINAL—BA 6/23 Interstate Properties Inc., 820 Hampden Ave., St. Paul, Minn., terminal bldg. at County Road C and North Snelling Ave. $900,000. Plans deposit $35. Haarstick-Lundgren & Assocs., Inc., N-212 First Natl Bank Bldg., St. Paul, archt. CD 3/31; under Glendenning Motorways, Inc., as owner.

Kan., **Scott City**—SCHOOL—BA 6/23 Bd. Educ., 1 story, 39,500 sq. ft. Junior High School. $485,000. Plans deposit $25. Radotinsky, Meyn & Deardorff, 1401 Fairfax Trafficway, Kansas City, Kan., archts. CD 3/17.

Colo., **Canon City**—COURT HOUSE—BA 6/25—Fremont Co. P. Bldg. Auth., 2 story, 40,000 sq. ft. court house. $800,000. Nixon & Jones, 3759½ Federal Blvd., Denver, archts. CD 9/24.

Minn., **New York Mills**—HOME FOR THE AGED—BA 6/25—Elders' Home, Inc., New York Mills, home for the aged. $450,000. Plans deposit $30. Stegner-Hendrickson, No. 2 O'Brien Center, Brainerd, archts. CD 6/1

Tex., **Fort Worth**—ENGINE RUN STATION—BA 6/30—Convair Div. General Dynamics, Grants Lane, general constr., B-58 Engine Run Station, incl. trenching, pipe work, concrete walls, built up roof, sheet metal and electrical work. $900,000. J. G. Turnbull, Inc., 4370 C Westside Dr., Dallas, archt. CD 3/2

Tex., **Houston**—HOSPITAL—Bids Asked Tidelands Hospital Co., c/o Nyal L. Cline, archt., 1513 W. Alabama St., hospital. $600,000. CD 5/21

BUILDINGS—SLC

▲ **Mo., Kansas City**—SHOPPING CENTER—E. C. Rhoden Enterprises, 3710 Broadway, Kansas City, Mo., soon lets contract 2 level 75,000 sq. ft. rein. con. shopping center, 631 car parking, Valentine Rd. and Broadway. $1,000,000. Geis Hunter & Ramos, 7920 State Line, Kansas City, Mo., archts. CD 1/14, under Boot Hill Investment Co., as owner.

▲ **Okla., Tulsa**—SCHOOL—Catholic Diocese, Bishop Victor J. Reed, Oklahoma City, soon lets contract Kelley Junior High School. $1,000,000. Murray, Jones & Murray, 4238 South Peoria, Tulsa, archts. CD 11/21/57

HEAVY CONSTRUCTION—LB & CA

MINNESOTA—State Hy. Dpt., Capitol Approach, St. Paul, Minn., Bids opened 6/5

Anderson & Sons, Inc., 100 North 7th St., Minneapolis, Minn., LB **$706,618** (4 bidders), sand-grav. subbase, grav. base, plant mixed bit. surf. and concrete paving, Carver Co. CD 5/22

▲ MISSOURI—State Hy. Dpt., Jefferson City.

Mo.—**J. A. Tobin Constr. Co.**, 3701 Rainbow Blvd., Kansas City, Kan., CA **$134,542**, 2-57 ft., 1-96 ft. box girder spans, Sta. 139 plus 63; CA **$113,104**, 36 ft., 55 ft., 62 ft., 40 ft. cont. void slabs, Sta. 131 plus 67; CA **$112,486**, 2-58 ft., 1-96 ft. box girder spans, Sta. 138 plus 34; CA **$166,388**, 2-70 ft., 1-116 ft. box girder spans, Sta. 132 plus 80, all foregoing in Jackson Co.; CA **$94,571**, 2-55 ft., 2-80 ft. I-beam spans, Sta. 158 plus 00, Platte Co.

Mo.—**Massman Constr. Co.**, 3917 Broadway, Kansas City 11, Mo., CA **$962,807**, 2-65 ft. cont. (68 ft., 85 ft., 68 ft. cont.) I-beam, 162.5 ft., 186 ft., 185 ft., 152.5 ft. cont. plate girder, 2-72 ft. cont. I-beam spans, Sta. 521 plus 05, Cole Co. Grand total $1,583,898. Bids May 22. CD 6/3, under LB

J. A. Tobin Constr. Co., 3701 Rainbow, Kansas City, Kan., LB **$583,394**, est. $700,000 (2 bidders), extension N-S runway at Mid-Continent International Airport, KANSAS CITY, MO. City, City Hall, Kansas City, Mo. Bids June 5. CD 5/21

▲† **MacDonald Constr. Co.**, 1310 S. Grand Blvd., St. Louis 4, Mo., LB **$2,426,115**, est. $2,940,119, relocation railroad tracks in 960 ft. tunnel and open-cut, removal existing elevated railroad structure past Jefferson National Expansion Memorial on river front, ST. LOUIS, MO. National Park Service, Dpt. Interior, Jefferson National Expansion Memorial, 415 Market St., St. Louis 2, Mo. Bids June 8. CD 5/5

▲† **Midland Constructors, Inc.**, 222 W. Adams St., Chicago, Ill., CA **$1,447,700**, 100 mi. power transmission line from Bismarck to Jamestown, NORTH DAKOTA. Bureau Reclamation, Dpt. Interior, Fargo, N. D. Bids May 19. CD 5/22, under LB

† **Schultz & Lindsay Constr. Co., Sornsin Constr. Co., Tennefos Constr. Co., Inc.**, 3201½ Broadway, Fargo, N. D., CA **$975,814**, levee for Williston Protective Works, Stage II, and Pumping Plant, near Williston, (FB-CIV-NO. 32-015-59-41), NORTH DAKOTA. U. S. Eng., Garrison, Riverdale, N. D. Bids Apr. 22. CD 4/13

† **American Elect. Co. of Kansas, Inc.**, 1104 W. Elm, Salina, Kan., LB **$424,300**, runways, overruns, approach lighting, Schilling Air Force Base, ENG-23-028-59-31, SALINA, KAN. U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo. Bids June 4. CD 3/25, under LB.

▲ SOUTH DAKOTA—State Dpt. Hys., Pierre,

S. D.—**H. G. Seeley Constr. Corp.**, DeSmet, S. D., CA **$345,501** (11 bidders), subbase, etc., 5.299 mi. I-90, Minn. Line west, Proj. I-90-9 (3) 411, Minnehaha Co.; CA **$475,648** (9 bidders), subbase, etc., 12.245 mi. I-90 from 2 mi. east of Wall S.E., Proj. I-092-3 (1), Pennington Co.;

S. D.—**J. H. Beckman Constr. Co.**, 3631 W. 14th St., Sioux Falls, S. D., CA **$324,574** (6 bidders), base course, bit. surf. 13.023 mi. S.D. 42 east, Proj. S 2211 (3), Davison and Hanson Counties; CA **$135,003**, base course, bit. surf. 7.188 mi. S.D. 23 from Lake City to Eden, Proj. S 2592 (4), Marshall Co.;

S. D.—**Myrl Clark**, Yankton, S. D.; CA **$307,478** (11 bidders), base course imprv., bit. surf. 11.545 mi. S.D. 75 and U.S. 18 from Neb. Line to Batesland, Proj. F-10-2 (1), Shannon Co.; CA **$391,203** (11 bidders), base course, bit. surf. 11.909 mi. S.D. 37 from S.D. 50 to North Co. line, Proj. F-047-1 (3), Bon Homme Co.;

S. D.—**Dean R. Rounds**, 1110 W. Main St., Rapid City, S. D., CA **$398,219** (8 bidders), base course imprv. and bit. surf. 12.700 mi. U.S. 18 from Batesland to east of Swett, Proj. F010-3 (1), Bennett Co.; CA **$242,303** (5 bidders), base course imprv., bit. surf. 10.772 mi. S.D. 37 west, Proj. S 1971 (5) & S 1972 (1), Douglas and Hutchinson Counties;

S. D.—**E. L. Lien Constr. Co.**, Veblen, S. D. and **A. W. Schnuerle**, S. Hy. 281, Aberdeen, S. D., CA **$313,438** (1 bidder), grading, subbase, etc., 11.062 mi. from 3 mi. N. of Groton north S. D. 37, Proj. F 047-7 (2), Brown Co.;

S. D.—**Art Schimkat Constr. Co.**, Pierre, S. D., CA **$230,009** (8 bidders), subbase, etc., 5.889 mi. S. D. 8 from 8 mi. E. of Trail City to U.S. 12, Proj. F 036-5 (1), Corson Co.;

S. D.—**G. H. Lindekugel & Sons, Inc.**, Mitchell, S. D., CA **$213,489** (10 bidders), base course imprvs., bit. surf. 10.718 mi. U. S. 12 from N. D. line to Lemmon, Proj. F 044-1 (1), Perkins Co.;

S. D.—**Western Contg. Co.**, 400 Benson Bldg., Sioux City, Iowa, CA **$1,160,015** (7 bidders), e. conc. 5.299 mi. I-90 Minn. Line West, Proj. I 90-9 (3) 411, Minnehaha Co.;

S. D.—**A. W. Schnuerle**, S. Hy. 281, Aberdeen, S. D., CA **$115,603** (4 bidders), base course, blotter type surf. 15.079 mi. Co. Hy. from S. D. 10 W. of Barnard North, Proj. S 4580 (1), Brown Co.;

(Continued on page 272)

NEW LOW-COST BALPLEX 760 SPEEDS HIGHWAY MAPPING

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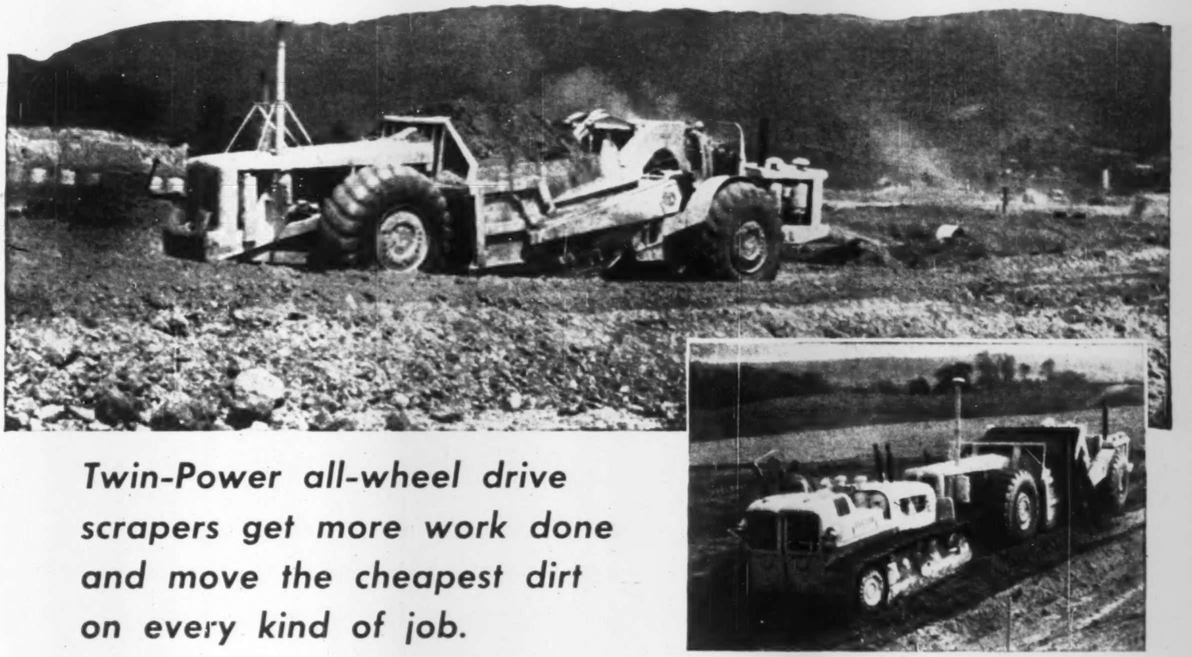

Twin-Power all-wheel drive scrapers get more work done and move the cheapest dirt on every kind of job.

The Euclid TS-24 Scraper can help you beat the squeeze on profits because it's the most versatile and most productive scraper in the field. Two engines, each driving an axle through separate torque converters and semi-automatic transmissions, provide maximum usable horsepower at all times. The "Twin" can self-load and move big loads out of soft or sandy borrow pits and over steep grades. With "no clutch" Torqmatic Drives, NoSpin differentials, and fast-acting, independent hydraulic controls, the TS-24 is easy to operate and has unequalled maneuverability.

Performance records from a wide range of work . . . from small jobs where one or two scrapers must handle all the earthmoving without supplementary equipment . . . to big yardage projects where the "Twin" is teamed with the Euclid TC-12 Crawler for high speed production . . . show that the TS-24 provides a big cost advantage.

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Only the
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2 engines—563 total h.p.
All-wheel drive
One-man operation
32 yd. heaped capacity
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2 Torqmatic Drives
NoSpin differentials
27.00 x 33 tires
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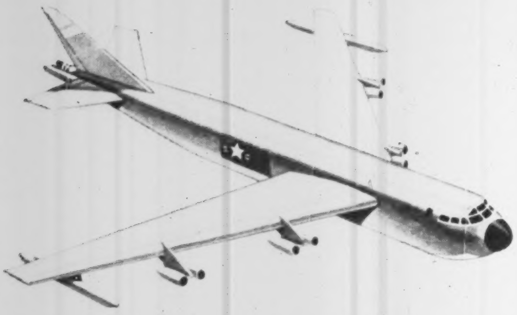

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THE "JET AGE" IS HERE. And with it is the problem of rebuilding airports to provide the longer, stronger, heavier runways these big jets need. That's why airport builders and designers are planning thicker, stronger airfield pavements with extra-heavy reinforcement . . . pavements that will match or exceed present jet requirements. And that's why the heaviest welded wire fabric ever produced was installed at the vital Kinross Air Force Base in Michigan.

Operational jets in commercial service now impose gear loadings in the neighborhood of 130,000 lbs., with gross weights of 295,000 lbs. Future models may go even higher. For that reason, only reinforced concrete provides the added strength to meet the unusually heavy and severe requirements of the "jet age." Specify USS American Welded Wire Fabric for reinforcing all runways, high speed turnoffs, taxiways, and service pads . . . get these important advantages:

- USS American Welded Wire Fabric distributes heavy wheel loadings over a larger area to prevent harmful overloads at any one point. Impact, shock, suddenly applied or released loads such as occur during landings and take-offs are more uniformly "absorbed" by each slab. Reinforced concrete slabs are 30% stronger than unreinforced slabs of equal thickness.
- USS American Welded Wire Fabric prevents harmful cracking from developing because of its uniformly spaced high-tensile-strength welded steel wire construction. Its action "knits" a slab together.
- USS American Welded Wire Fabric unifies the action of any slab when it expands and contracts due to temperature change.
- Longer, wider slabs can be laid when USS American Welded Wire Fabric is used. This means fewer joints, fewer load transfer assemblies. The reduction in the number of joints not only means economy, but also a smoother, safer landing surface.
- When existing airfield pavements must be strengthened, USS American Welded Wire Fabric reinforced concrete overlays will produce unbroken grade lines and provide additional strength. Thus, maximum economy is achieved.

Specify USS American Welded Wire Fabric. It's available in a wide variety of styles, lengths, and widths . . . in wire sizes from ½" diameter to 16 ga. and in longitudinal or transverse wire intervals of 2" to 16". The engineers at American Steel & Wire will be glad to tell you more about the application possibilities of fabric and how it can serve your needs. Get in touch with American Steel & Wire, Dept. 9133, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

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Paving Material Supplier: Scioto Supply Company, Lansing, Michigan
Design and Supervision: Corps of Engineers, U. S. Army

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At Kinross Air Force Base, workmen are installing a section of USS American Welded Wire Fabric—Style 55-7/07-0 (7/0 Gauge is 0.490" Diameter Wires). USS American Welded Wire Fabric is entirely fabricated by electrically welding all intersections of the high strength steel wires. This insures positive placement of the steel in the slab and eliminates costly field tying and extra handling.

World's heaviest Welded Wire Fabric big jets land safely!

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CIRCLE O-5 READER SERVICE CARD

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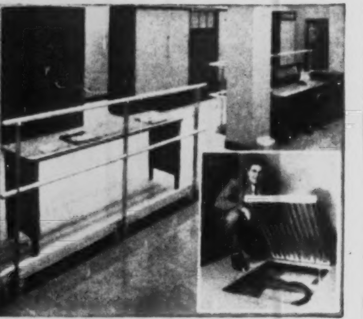

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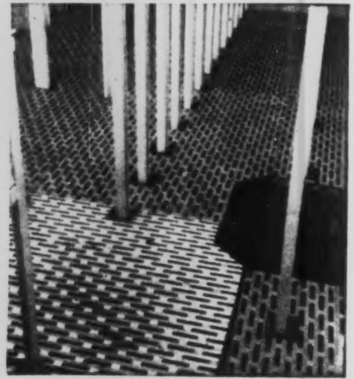

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(Continued from page 268)

S D—**J L Healy Constr Co.**, 301 Syndicate Bldg, Sioux Falls, S D CA $143,365 (6 bidders), base course, bit surf 7 705 mi Co. Hy from Alexandria to SD 42, Proj S 2270 (1), Hanson Co

S D—**Highway Constr Co.**, Box 206, Rapid City, S D, CA $279,238 (10 bidders), base course, bit surf 9 932 mi U S 281 from N Co line to S D 34 Proj F045-4 (2), Jerauld Co.;

S D—**Summit Constr Co.**, 728 S Anne St., Rapid City, S D, CA $885,621 (8 bidders), subbase, etc 12 245 mi I 90 from 2 mi E. of Wall South East Proj I 092-3 (1), Pennington Co.;

S D—**P. A. Bradbury Constr Co.**, Wylie Park Rd, Aberdeen, S D, CA $345,745 (17 bidders), base course bit surf 18 831 mi S D 20 from Hoven to Onaka F 042-1 (2) & F 042-2 (3) & Approach Rd Potter and Faulk Counties;

S D—**Central Contg Co.**, Deadwood Rd, P O Box 172, Rapid City, S D, CA $757,195 (7 bidders), c conc 4 042 mi U S 281 from Aberdeen to Richmond Lake Proj F 045-7 (4), Brown Co

S D—**G A Olson Constr Co., Inc.**, Marshall Minn, CA $136,920 (6 bidders), subbase 6 005 mi S D 20 from SD 37 East Proj F042-3 (2), Spink Co

S D—**Bert Hustrulid & Sons, Inc.**, Beresford S D, & **See-Nel Constr Co.**, Chester, S D, CA $224,765 (13 bidders), subbase 5 075 mi S D Hy from S D 59 to Gavins Point Dam, Proj S 9401 (1) Yankton Co.;

S D—**Tennefos Constr Co., Inc.**, Box 1363, Fargo N D CA $320,376 (4 bidders), subbase surf 1 763 mi US 12 thru Mobridge Proj F 044-3 (1), Walworth Co Grand total $7,745,528 Bids June 2 CD 5 6

† **J. D Armstrong**, Box 528 Ames Iowa CA $622,015, channel cutoffs and levees Section IV, Salina, CIVENG-23-028-59-95 KANSAS U S Eng 1800 Federal Office Bldg Kansas City 6 Mo Bids May 14 CD 5 20 under LB

▲ **Slovak Bros., Inc.**, Box 5096, Corpus Christi, Tex., LB $333,600 (12 bidders), Proposal A Increment 1, sewage treatment plant (Job No 94B), HARLINGEN, TEX City, City Hall, Harlingen Tex Bids June 5 CD 5 13

John J Stokes Constr Co., Box 691 San Marcos Tex LB $494,600 (12 bidders) Proposal B Increment No 1 for sewage treatment plant (Harlingen, Tex.)

English Constr. Co., 1042 Conrad Sauer St Houston Tex LB $273,481 (10 bidders), sanitary sewerage sys imprvs (Harlingen, Tex.)

▲† **Davis & Butler Constr Co.**, Doly Bldg, Salt Lake City, Utah CA $1,669,359, concrete pipe line sys. for Collbran Project in west central COLORADO, Bureau Reclamation, Dpt. Interior, Collbran, Colo. Bids May 19 CD 5 22, under LB.

BUILDINGS—LB & CA

† **McDonald Co., Inc.**, Box 93 Brainerd Minn LB $550,480 (6 bidders) L-shape 1st floor and part 2nd floor, bsmnt POST OFFICE Laurel and Fifth Sts BRAINERD MINN General Services Admin. P Bldgs Service 2306 East Bannister Rd Kansas City 10 Mo. Stegner-Hendrickson 2 O'Brien Center, Brainerd Minn, archts Bids June 4 CD 5/5.

▲† **Base Procurement Office** Whiteman Air Force Base Knob Noster Mo received no bids May 28 154 units Capehart HOUSING Whiteman Air Force Base IFB 23-606-59-35 KNOB NOSTER MO $2,500,000 Will re-advertise CD 5 19

Texarkana Constr Co., 2819 Boulevard Texarkana, Ark CA $683,454 est over $500,000 30 bed HOSPITAL addn CAMDEN ARK Ouachita County Hospital Court House Camden Ark Bids Apr 14 CD 5 4 under LB.

▲ **Vollmer Constr Co.** 840 N Main St Wichita, Kan. LB $1,666,990 general contract eight units each 1 story, brick, concrete campus type HIGH SCHOOL WICHITA KAN Rural High School Dist 923 W Grand Ave Wichita Kan Williamson Loebsack & Assocs Rte 4 Topeka Kan, archts.

Vaughn Plbg & Heating Co. 3315 Arkansas St., Wichita Kan LB $434,000 mechanical contract (rural HIGH SCHOOL Wichita Kan.)

H G Weller Constr., Inc. Box 3885 Wichita Kan CA $517,960, 1 story balcony, bsmnt 22,000 sq. ft 127x144 ft CHURCH WICHITA KAN College Hill Methodist Congregation 2908 E 1st Wichita Kan Bids Apr 24 CD 5 15 under LB

Martin K Eby Constr Co., Box 1679 Wichita Kan., CA Est $600,000 WOMEN'S DORMITORY STUDENT CENTER MARRIED STUDENTS APARTMENTS etc., WINFIELD KAN Southwestern College Bd Trustees, Winfield Kan. Buck Assocs., 1806 Hillcrest Dr., Bartlesville Okla archts CD 4 22 under CA

▲† **Philip Yousem** 1500 Lincoln Blvd Venice Calif., CA $3,505,310 216 units CAPEHART HOUSING Offutt Air Force Base No 2 FORT CROOK NEB Procurement Office, Offutt Air Force Base Omaha 2, Neb Henningson Durham & Richardson Steele Sandham & Weinstein 251 Aquilla Ct., Omaha 2, Neb., archts Bids Apr 14 CD 5 6 under LB

Globe Constr Co., 1631 Alta Vista St, Dallas Tex Owner Builds $410,000, 42 DWELLINGS, near Gus Thomasson Rd, DALLAS, TEX. CD 5 28

Covington Bros., 3318 N Harding St Fort Worth, Tex CA Est $500,000, 2 story, 64 unit, masonry, concrete steel MOTOR HOTEL, Jacksboro Hy and 28th St FORT WORTH, TEX Julian R Meeker, c/o Chas E Armstrong, archt., 1013½ University Dr, Fort Worth, Tex Awarded June 3

R. C. Mahon Co. (Bldg Products Div.), Box 4666, 6565 E 8 Mile Rd., Detroit 34 Mich., CA Est $750,000 2 x 206 x 130 ft jet airfact HANGARS for sound testing FORT WORTH, TEX Convair, Div General Dynamics, Grant's Lane, Fort Worth, Tex CD 3 2

▲ **Baxter Constr Co.**, 5327 Allen St Houston Tex., LB $1,957,000 (9 bidders), Jefferson Davis HOSPITAL remodeling and addns, HOUSTON, TEX City, City Hall and Harris County, Courthouse, Houston, Tex Bids June 3 CD 5/13

Linbeck Constr Co., Box 13007, Houston Tex CA $500,000, Base Bid OFFICE, HOUSTON, TEX Hudson Engineering Corp., 2711 Danville St., Houston Tex CD 4 3

Cantrell & McMillan Builders, Inc., 5348 Inker St., Houston, Tex., Owner Builds, $560,000, 14 masonry DWELLINGS, $450,000, 9 masonry DWELLINGS Timber Grove Subdivision off Taylor Lake HOUSTON TEX CD 5 27

Harmony Home Builders, 3511 W Dallas St, Houston Tex., Owner Builds $416,000, 18 DWELLINGS, HOUSTON, TEX. CD 5 7

T. B. Wood Bldg Co., 1226 Spring Rock St, Houston, Tex., Owner Builds, $411,225, 22 DWELLINGS, HOUSTON, TEX CD 5 7

▲ **E. O Parsons, Contractor**, Monahans, Tex., Owner Builds, $438,000, 44 DWELLINGS, $408,100, 41 DWELLINGS, $403,750, 39 DWELLINGS KERMIT, TEX Grand total $1,249,850. Fred Armstrong, Pecos, Tex., archt. CD 5 19

J B Andrews Bldg Co., 104 Phelps St, Dallas, Tex Owner Builds, $438,100, 34 DWELLINGS $425,000, 32 DWELLINGS Eastern Heights Subdivision MESQUITE TEX CD 5 25

S. R Duncan & Assocs., P.O Box 1347, Lubbock, Tex., CA $786,719, 2 story, brick, tile, concrete EDUCATION BLDG and 1 story CHAPEL PLAINVIEW TEX First Methodist Church, Plainview Tex Bids May 20 CD 5 26, under LB

Boyce Gaskin, Contractor, Inc., 4621 Blanco Rd San Antonio, Tex., Purchase and Hire $400,000, 40 APARTMENT UNITS, Babcock and Glenview Rds., SAN ANTONIO, TEX

Harlandale Housing Corp., 2534 Military Dr., San Antonio, Tex., Owner Builds, $418,200, 32 DWELLINGS, Kelly and Brooks Fields Air Force Base areas, SAN ANTONIO, TEX CD 5 21

Bob Hohenberger, Builder, Inc., 3814 Southport St., San Antonio, Tex., Purchase and Hire, $416,500, 38 DWELLINGS, off Pleasanton Rd., SAN ANTONIO, TEX CD 5/15

Hollywood Park Bldg Co., 234 Harrison St., San Antonio, Tex Owner Builds $432,150, 14 DWELLINGS, Hollywood Park Estates, SAN ANTONIO, TEX CD 5 28

Ted C Pruske, Contractor, 221 Herwick St., San Antonio, Tex., Purchase and Hire, $411,200, 30 DWELLINGS, SAN ANTONIO, TEX CD 5 15

Arthur J. Puig, Builder, 2335 Vance-Jackson Rd., San Antonio, Tex., Purchase and Hire $422,125, 21 DWELLINGS, Sunset Hills and Sunset Park areas, SAN ANTONIO, TEX CD 5 28

D. J. Rheiner Constr. Co., 409 Insurance Bldg, San Antonio 5, Tex CA Est $785,000, two 82,442 sq. ft. masonry STORES, 9 acre tract, Broadway, SAN ANTONIO, TEX; Gulf Mart Inc., 8508 Broadway Ave., San Antonio, Tex CD 6-5

▲† **Burl Johnson Assocs.**, P.O. Box 4716, 2570 S Harvard St., Tulsa, Okla., CA $4,858,273, 300 units CAPEHART HOUSING No. 2, Glasgow Air Force Base, GLASGOW, MONT Procurement Office, Glasgow Air Force Base, Glasgow, Mont. Bids Apr. 30 CD 6-3, under LB

FAR WEST

HEAVY CONSTRUCTION—BA

▲ **Calif., Los Angeles**—CENTRAL UTILITIES PLANT, etc.—BA 6 30—City Dpt. Airports, City Hall; central utilities plant, service and maintenance bldgs., Los Angeles International Airport—Proj 115.06 $2,721,740 CD 6 8 56

▲ **CALIFORNIA**—BA 7 21—Div. of San Francisco Bay Toll Crossings, 151 Fremont St., San Francisco [illegible]

San Francisco Co.—removing [illegible] paving of lower deck of West Bay spans of San Francisco-Oakland Bay Bridge and bridge reconst. $2,[illegible]

BUILDINGS—BA

Calif., Fresno—CLASSROOM—BA 6 30—State Div. Architecture, 1120 N St., Sacramento; 2 story penthouse, 31,000 sq. ft. Classroom No. 3, Fresno State College, W. O. 4160GC-39, $510,000. Plans deposit $50. CD 12 4

Calif., Corning—HIGH SCHOOL—BA 7 1—Corning Union High School Dist., Corning; 52,000 sq. ft. high school, $900,000. Plans deposit $50. Harold Gimeno, 1400 N. Sycamore St., Santa Ana, archt. CD 6 19 58

▲ **Wash., Yacolt**—PLANT—Bids Asked—International Paper Co., Long-Bell Div., Longview; first phase plywood and lumber plant, Chelatchie Prairie, Lewis River area. Total cost $6,000,000. CD 3 26

BUILDINGS—SLC

Utah, Salt Lake City—DORMITORY—Westminster College, 1840 S. 13th E.; plans lets contract 3 story, 26,000 sq. ft., reinforced, brick, women's dormitory, $450,000. Donald H. Panushka, Zions Savings Bldg., archt. CD 10 21 57

HEAVY CONSTRUCTION—LB & CA

ARIZONA—State Hy. Dpt., 206 S. 17 Ave., Phoenix. Bids opened 6 5

Givens Constr. Co., 2200 S. 19 Ave. (Box 470), Phoenix, Ariz., LB $513,320 (9 bidders), grading, drain, S M A B, bit road mix, armored asph. seal coat, Flagstaff-Valle Airport Highway, Coconino County Proj. beginning approx. 18 mi. NW of Flagstaff and Ext. 20

(Continued on page 276)

PANEL NO 1
TRANSFER PANEL

Typical A-C pumping installation is this one in the District No. 2 Water Works at Pueblo, Colorado. Motors and control are also supplied by Allis-Chalmers.

From this cubicle comes advance proof of pump performance

This master control room of Allis-Chalmers pump test floor is far removed from public works installations. Yet, engineers working here know exactly what your needs are — and which Allis-Chalmers pump will best do the job.

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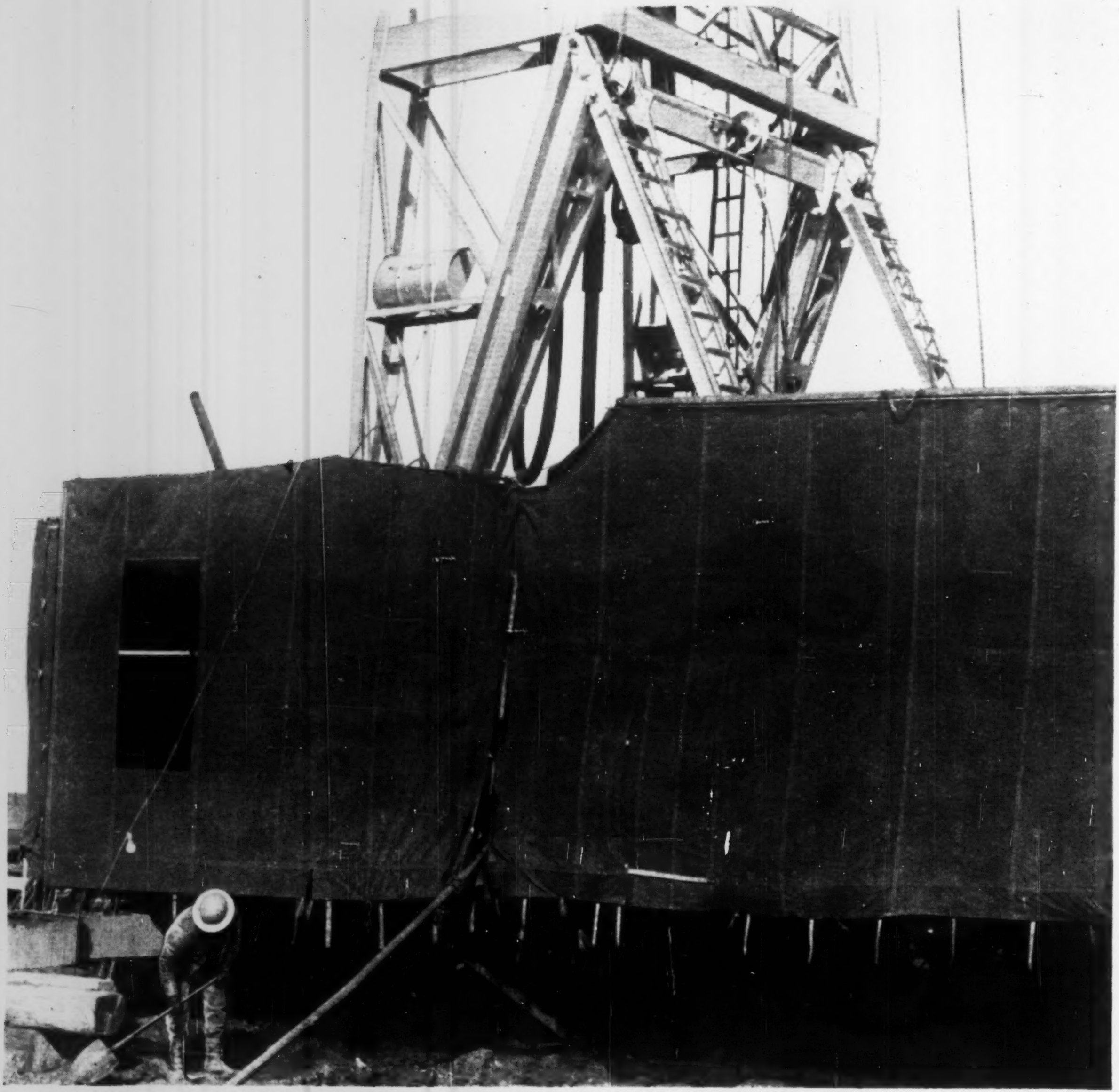

CANVAS-RIGGED OIL RIG This oil drilling rig near Caldwell, Kansas, is one of ten such rigs which are owned and operated by the Herndon Drilling Company, one of the oldest drilling contractors and oil producers in the mid-continent. In addition to its own operations, Herndon does contract drilling for other producers as well in Kansas, Oklahoma, Illinois, Colorado, New Mexico and Indiana. During the winter months, each of its rigs is protected by neatly tailored curtains that snap into position and can be quickly removed for storage in the summer. These curtains were manufactured for Herndon by Textile Fabricators of Hutchinson, Kansas and made from Mount Vernon duck.

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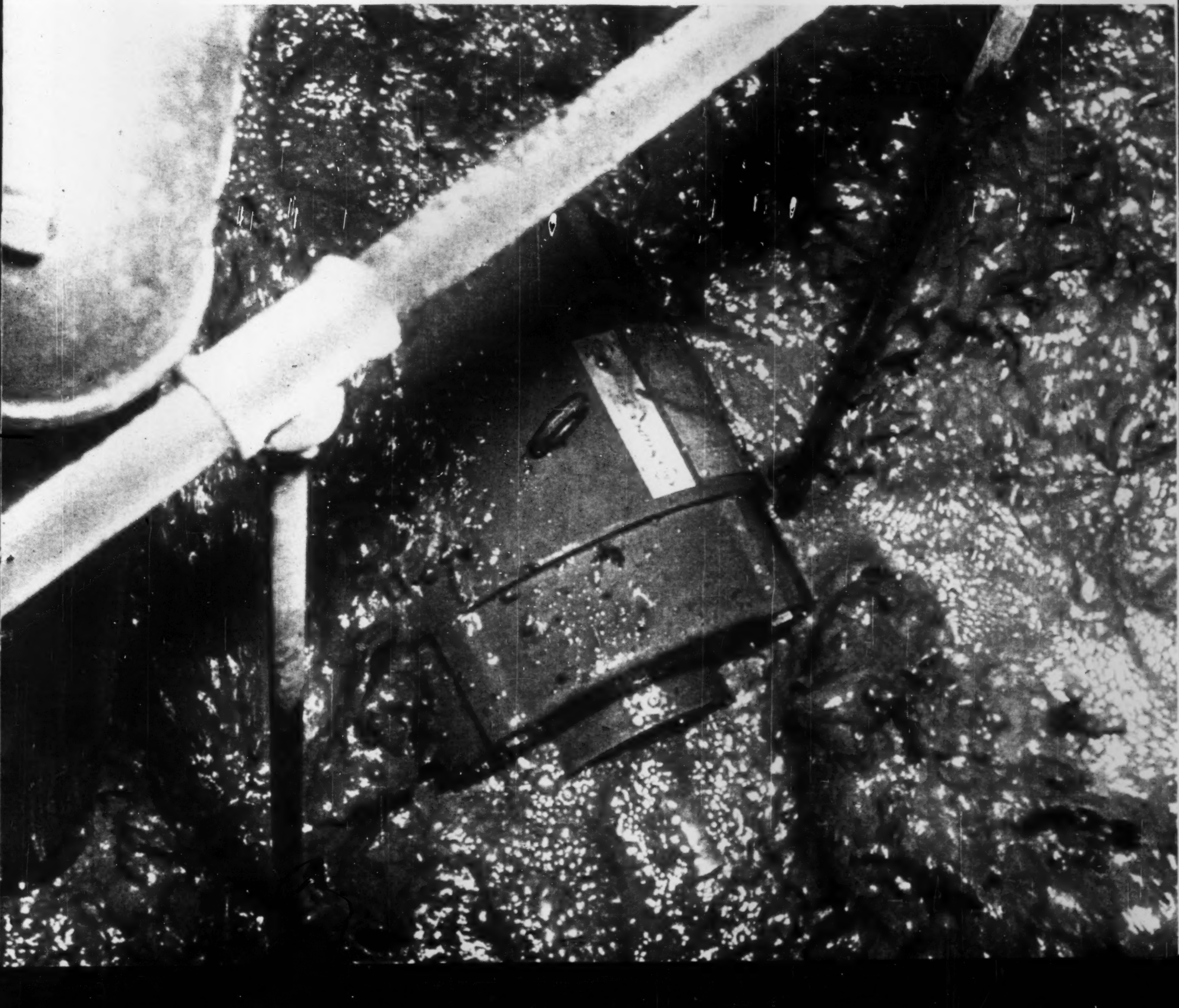

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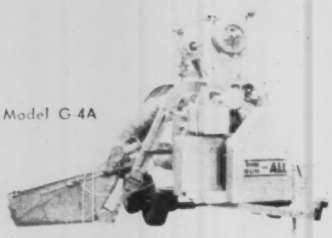

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CIRCLE Q-3 READER SERVICE CARD

(Continued from page 272)

mi. N E over County Rd toward Williams-Grand Canyon Highway, State R 64, Coconino Co.; LB $168,373 (12 bidders), select mat aggregate base, bit. road mix and emulsified asph seal coat, Apache Trail Highway beginning 5¾ mi. south of Roosevelt Dam and extending SE over SR 88 for 2 mi. toward Globe, Gila Co. CD 5 21

▲† **C. H. Leavell Constr. Co.,** 1900 Wyoming Ave., El Paso, Tex., LB $2,081,005 (9 bidders), hospital, Davis-Monthan Air Force Base, ENG-04-353-59-92, TUCSON, ARIZ. U. S. Eng., 751 S. Figueroa St., Los Angeles 17, Calif. Bids June 9. CD 5/12

▲ **CALIFORNIA** State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 6 4.

Sully-Miller Contg. Co., 1500 W. 7th St., Long Beach, Calif., LB $1,186,166 (8 bidders), grading, paving to widen 6.5 mi. Whittier Blvd. and Fullerton Rd. (State Hy. Rte. 2) to 4 lane divided hy. between Valley Home Ave. at Los Angeles Co. line in La Habra and Brea Blvd. in Fullerton, VII-Ora-2-Ful, F LHB, Orange Co. CD 5 6.

▲† **J. B. Stringfellow Co.,** Box 6, Riverside, Calif., CA $1,469,300, levee and channel imprvs., Santa Clara River Levee, E. Rio, Ventura Co., CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Apr. 28, awarded June 1. CD 5 1, under LB.

▲ **Charles J. Rounds Co.,** 16510 E. Gladstone Ave., Box 635, Azusa, Calif., CA $1,634,529, storm drain, Benedict Canyon Storm Drain Sys. Los Angeles and Beverly Hills, Proj. 45, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids May 22, awarded June 2. CD 5 26, under LB.

Sondgroth Bros., P. O. Box 1055, Mountain View, Calif., LB $548,386 (5 bidders), street imprvs. between Whisman Rd. and Mountain View-Alviso Rd., storm drains, water mains, sewers, curbs, gutters, street paving and lighting, etc., MOUNTAIN VIEW, CALIF. City, City Hall, Mountain View, Calif. Bids June 2. CD 5 6

▲ **Frederickson & Watson Constr. Co.,** 873 81 Ave., Oakland, Calif., CA $1,321,111, pavement for runway extensions, Contract No. 239, SAN FRANCISCO, CALIF. P. Utilities Comm., City Hall, San Francisco, Calif. Awarded June 3. CD 6 2, under LB.

▲ **Pestana, Inc.,** 1620 S. 7, San Jose, Calif., CA $1,481,650, sanitary sewer in Live Oak Areas near SANTA CRUZ, CALIF. Bd. Supervs., Santa Cruz County, Courthouse Annex, Santa Cruz, Calif. CD 6 10, under LB.

BUILDINGS—LB & CA

Jordan-Wilcomb Co., 406 S. 6 St., Boise, Idaho, LB $425,336, 2 story, brick radiology and pathology dpts. to HOSPITAL, BOISE, IDAHO, St. Lukes Hospital, 310 N. 1 St., Boise, Idaho. Bids May 26. CD 5 20.

▲ **Ben H. Davis & A. P. Neilsen,** 130 S. 5th St. E., Salt Lake City, Utah, CA Est. $2,500,000, HOTEL, 201 N. Main St., 3 level parking garage, SALT LAKE CITY, UTAH. Ben Albert Imprvt. Co., c/o Slack W. and David Winburn, archts., 225 Surety Life Bldg., Salt Lake City, Utah.

▲† **Hebb & Narodick Constr. Co., Inc.,** 4225 23 Ave. W., Seattle, Wash., CA $1,056,000, 64 units Capehart Act HOUSING, Fairchild Air Force Base, Inv. 59-64, SPOKANE, WASH. U. S. Eng., 1519 S. Alaskan Way, Seattle, Wash. Bids Mar. 24. CD 3 26, under LB.

Max H. Resnick, 18747 Sherman Way, Reseda, Calif., CA $410,400, 6 stucco APARTMENTS, Owensmont Ave., CANOGA PARK, CALIF. Northridge Land Co., Inc., 18747 Sherman Way, Reseda, Calif.

▲ **Victoria Crest Co.,** 7807 Sunset Blvd., Los Angeles 46, Calif., Owner Builds, $1,256,500, 97 stucco DWELLINGS, Citrona St., Superior St. and Itasea St., Paveras St. and Marilla St., Delco, Oso and Fallbright Aves., Tract 23417, CHATSWORTH, CALIF. Jennings Eng. Co., 9219 W. Pico Blvd., Los Angeles, Calif., engr.

Malgren Constr. Co., 10835 Santa Monica Blvd., Los Angeles, Calif., CA $528,000, 31 DWELLINGS, Ceylon Rd., Tr. 3363, COSTA MESA, CALIF. Sycamore Land Co., 10835 Santa Monica Blvd., Los Angeles, Calif.

▲ **Louis C. Dunn, Inc.,** 681 Market St., San Francisco, Calif., LB $1,295,000, combined bid, (4 bidders), masonry, steel, Thomas Edison, Abraham Lincoln and Daniel Webster Elementary SCHOOLS, DALY CITY, CALIF. Jefferson Elementary School Dist., 48 Park Plaza Dr., Daly City, Calif. Bids June 4. CD 5 21

W. H. Potter, 174 N. Hamet St., Escondido, Calif., Owner Builds, $568,400, 58 DWELLINGS, Erica St., Escondido Plaza Tract, ESCONDIDO, CALIF.

Harris Constr. Co., P. O. Box 109, Fresno, Calif., LB $449,600 (4 bidders), 1 and 2 story, 22,700 sq. ft. reinf. con., structural steel, wood frame CAFETERIA bldg., FRESNO, CALIF. State Div. architecture, 1120 N St., Sacramento, Calif. Bids June 2. CD 5 11

▲ **Lewis C. Nelson & Son,** 2915 McCall Ave., Selma, Calif., LB $1,263,000, Base Bid, (6 bidders), 2 story, bsmt. POLICE FACILITIES and EMERGENCY HOSPITAL, FRESNO, CALIF. City, Police Dpt., Merced and Broadway, Fresno, Calif. Walter Wagner & Partners, 1830 Van Ness Ave., Fresno, Calif., archts. Bids June 2. CD 4 18 57.

Beckner Constr. Co., 2640 River Ave., South San Gabriel, Calif., CA $921,000, reinforced brick Grandview ELEMENTARY SCHOOL, LA PUENTE, CALIF. Rowland School Dist., 18013 Pajaro Rd., La Puente, Calif. Bids May 5. CD 5 14, under LB.

Maino Constr. Co., Box 709, 2238 S. Broad St., San Luis Obispo, Calif., CA $550,371, 2 story, concrete block SCIENCE BLDG., concrete block LIBRARY, 2 story concrete block CLASSROOM BLDG., 1 story frame, stucco SHOP, LOMPOC, CALIF. Lompoc High School Dist., 203 S. "L" St., Lompoc, Calif. Bids May 7, awarded May 26. CD 5/20, under LB.

Secrest & Fish, Inc., 1909 W. Whittier Blvd., Whittier, Calif., CA $986,559, concrete piling, masonry constr., NAVY LANDING BLDG. at Long Beach Harbor, Spec. R-2963, LONG BEACH, CALIF. City, 205 W. Broadway, Long Beach, Calif. Bids May 21, awarded June 2. CD 6/1, under LB.

Butler & Butler, 10817 Santa Monica Blvd., Los Angeles, Calif., LB $572,900, two 2 story, steel, wood frame STORES, 3848-88 Crenshaw Blvd., LOS ANGELES, CALIF. Crenshaw Square Shops, c/o Dike Nagano, archt., 11950 San Vicente Blvd., Los Angeles, Calif.

Carter Mack Builders, Box 457, 25100 S. Normandie Ave., Harbor City, Calif., LB $604,133, (7 bidders), Van Deene Ave., SCHOOL, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids June 2. CD 5 25.

▲ **E. C. Messer Constr. Co.,** 4822 W. Jefferson Blvd., Los Angeles, Calif., LB $2,459,000, 2nd increment, rein. con. (4 bldgs.) East Los Angeles JUNIOR COLLEGE, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro, Los Angeles, Calif. Bids June 5. CD 5 12.

Tom E. Norcross, 6053 Atlantic Ave., Long Beach, Calif., LB $794,400, est. $880,000 (11 bidders), 112th St. SCHOOL, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids May 29. CD 5/21.

Ruane Corp., 4934 N. Walnut Grove Ave., San Gabriel, Calif., CA $441,463, 4 story, aluminum, concrete glass OFFICE, 625 S. Kingsley Dr., LOS ANGELES, CALIF. Brander & Co. Insurance, 3460 Wilshire Blvd., Los Angeles, Calif. Daniel, Mann, Johnson & Mendenhall, 3325 Wilshire Blvd., Los Angeles, Calif., archts.

Means & Ulrich, 1218 S. Main St., Santa Ana, Calif., LB $767,500, est. $900,000, (14 bidders), 6 frame stucco bldgs., Portola HIGH SCHOOL, ORANGE, CALIF. Orange School Dist., 525 N. Shaffer St., Orange, Calif. Bids May 28. CD 5 7.

▲ **Williams & Burrows, Inc.,** 500 Harbor Blvd., Belmont, Calif., CA $1,754,470, HIGH SCHOOL incl. gym and swimming pool, San Carlos, REDWOOD CITY, CALIF. Sequoia Union High School Dist., 480 James St., Redwood City, Calif. Bids May 26. CD 6 3, under LB.

Burgener Constr. Co., 1150 Silverado, La Jolla, Calif., CA $400,000, 25 DWELLINGS, Donald Ave., Ruth Rd., SAN DIEGO, CALIF. Suburban Developers, Box 569, La Jolla, Calif.

Tech Constr. Corp., 3949 Clairemont Dr., San Diego, Calif., CA $665,000, 51 DWELLINGS, Elvee St., Murray Ridge Rd., Chantilly Ave., SAN DIEGO, CALIF. Crimson Investment Corp., 3949 Clairemont Dr., San Diego, Calif.

▲ **Jas. N. Starbird & Co.,** 1158 E. 58th St., Los Angeles, Calif., Owner Builds, $1,296,740, 113 DWELLINGS, Vallecito Dr., 25th St., Pelican Ave., Grenadier Ave., SAN PEDRO, CALIF. C. G. Olsten, 10230 Lakewood Blvd., Downey, Calif., archt.

▲ **Kingsley, Inc.,** 2340 Fletcher Parkway, El Cajon, Calif., Owner Builds, $1,000,000, 100 frame, stucco DWELLINGS, Carita St., Bellagio Rd., Highdale Rd., Carbon Hills Unit No. 4 Tract, SANTEE, CALIF.

C. W. Driver, Inc., 2618 W. Temple St., Los Angeles 26, Calif., CA $800,000, 3 story, rein. con. WAREHOUSE addn., VENICE, CALIF. Vietie Bros. Mfg. Co., 5701 W. Century Blvd., Los Angeles 45, Calif. Risley & Gould, 2502 W. 3rd St., Los Angeles, Calif., archts. Hillman & Nowell, 316 W. 5th St., Los Angeles, Calif., engrs.

Valleywood Bldg. Co., 8549 Wilshire Blvd., Beverly Hills, Calif., Owner Builds, $869,200, 75 stucco DWELLINGS, Glade Ave., Bergquist Ave., Jackie Ave., Collier Ave. and Erwin St., Tract 21889, WOODLAND HILLS, CALIF. Engineering Service Corp., 1127 W. Washington Blvd., Los Angeles, Calif., engrs.

▲ **Hawaiian Dredging & Constr. Co.,** 1350 Ala Moana, Honolulu, Hawaii, CA $1,700,000, OFFICE alterations and 9 story annex addn., King and Bishop, HONOLULU, HAWAII. Bank of Hawaii, 140 S. King St., Honolulu, Hawaii. Rothwell & Lester, 843 Fort St., Honolulu, Hawaii, archts.

CANADA

BUILDINGS—BA

Ont., Toronto—OFFICE—BA 6/22—Ontario Credit Union League Ltd., 30 Bloor St. W. (selected list of bidders), 2 story, structural steel frame, concrete block, brick 16,000 sq. ft. credit union office Eglinton Ave. E. and Victoria Park Rd. $500,000. F. Starmach, 160 Spadina Rd., archt., Heinz Urbat, 105 Carlton St., engr. CD 1 28 58.

HEAVY CONSTRUCTION—LB & CA

ALBERTA Dpt. Highways, Parliament Bldgs., Edmonton.

Poole Engineering (1958) Ltd., 10503 109 St., Edmonton, Alta., CA $976,360, grading, etc., approx. 20 mi. Hy. 50 north of Morse River to Swan Hills, Edmonton. Awarded June 4.

Poole Constr. Co. Ltd., 10503 109 St., Edmonton, Alta., CA $492,282, (3 bidders), water and sewer serv. in FORT SIMPSON, NORTH WEST TERRITORIES. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.

▲ **Refinery Engineering Ltd.,** 560 Bayview Ave., Toronto, Ont., CA $1,032,726, Compressor Station

(Continued on page 280)

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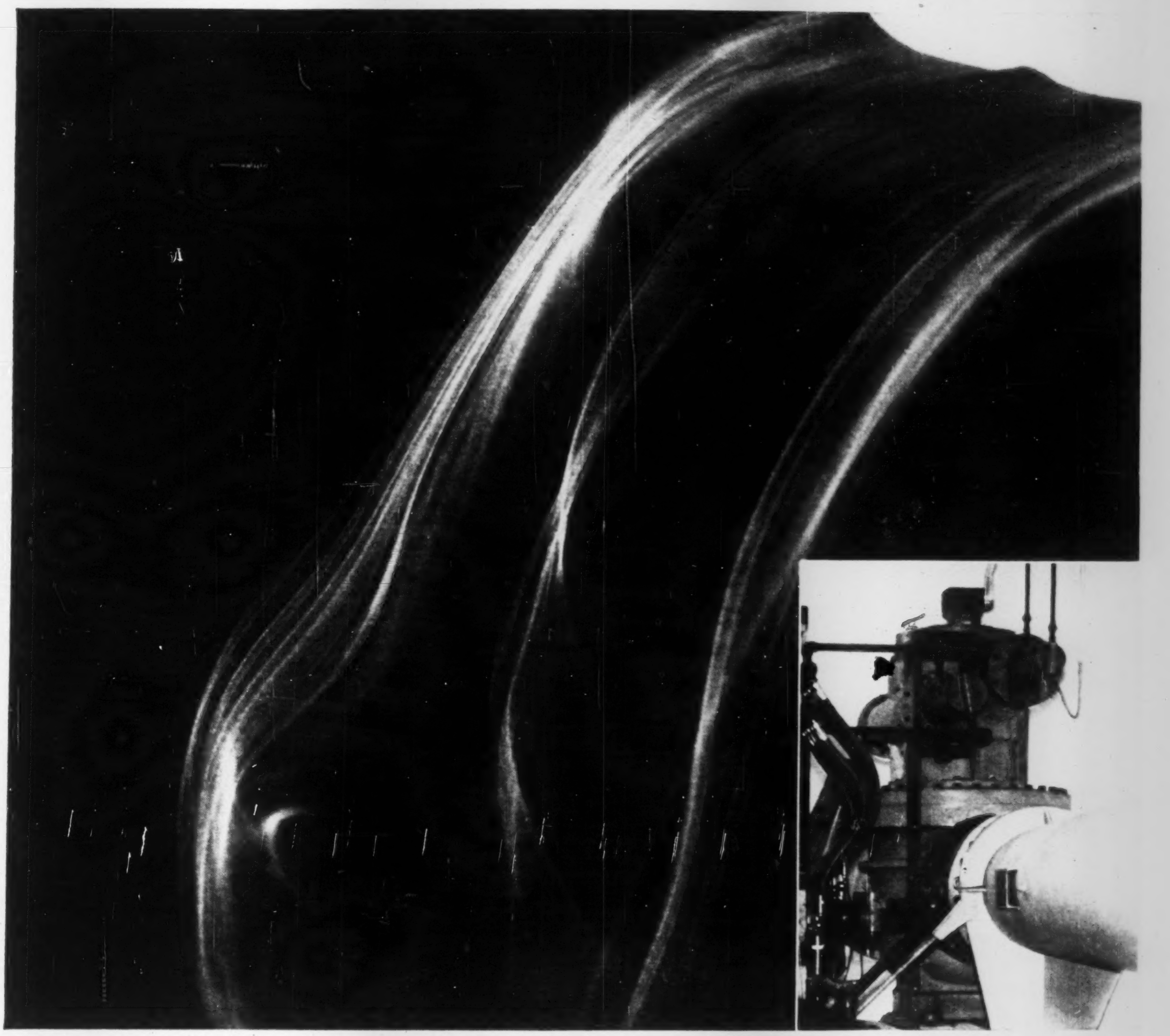

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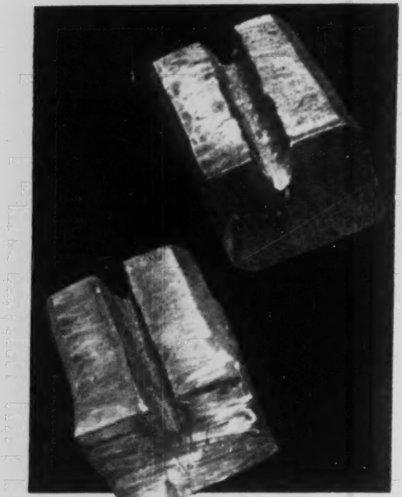
A-C ALLIS-CHALMERS

CIRCLE S-3 READER SERVICE CARD



Which piece of 20 carbon steel was gouged in 26 minutes?

These two blocks of 20 carbon steel are 7 in. square and 8 in. long. The groove is $2\frac{1}{4}$ in. deep. The block on the right took $1\frac{3}{4}$ hours to chip out. The one on the left was gouged with an Arcair torch in 26 minutes — four times faster!

You can cut, gouge, bevel or groove any metal using the Arcair method — and get dramatic cost savings with an investment of much less than $100.

HOW DOES ARCAIR WORK? The torch utilizes air from an 80 p.s.i. air line, current from a welding machine and special electrodes to melt and remove metal. Fifteen minutes instruction is all an operator needs.

WHAT'S YOUR PROBLEM? Write us your specific problem. We'll give you a speedy and sincere answer.

Arcair

THE ARCAIR CO., 427 S. Mt. Pleasant St.
Lancaster, Ohio

Send me more information on Arcair Torches and special electrodes.

NAME ______
TITLE ______
COMPANY ______
ADDRESS ______
CITY ______ STATE ______
MY PROBLEM ______

CIRCLE S-7 READER SERVICE CARD

(Continued from page 276)

No. 92, Parthia, ONTARIO. Northern Ontario Pipe Line Corp., c/o Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Grand total $3,123,768.

Fluor Corp. of Canada Ltd., 160 Bloor St. E., Toronto, Ont., CA $1,103,430. Compressor Station No. 80, Geraldton (Ontario).

Canadian Comstock Co. Ltd., 206 Laird Dr., Leaside, Toronto, Ont., CA $987,612. Compressor Station No. 58, Ignace (Ontario).

ONTARIO Dpt. Hys., Parliament Bldg., Toronto,
Peel Constr. Co., Box 1000 Brampton, Ont., CA $549,292, granular base and hot mix paving Hy. 401, 5.43 mi. Contract 59-104. Bids May 27. CD 6-3, under LB.

ONTARIO Dpt. Highways, Parliament Bldgs., Toronto, Ont. **Standard Iron & Steel Wks. Ltd.**, 3430 Dundas St. W., Toronto, Ont., LB $660,940 (10 bidders) structural steel Hy. 401 Hogg's Hollow Viaduct, 2,120 tons. Contract 59-81.

Ont. **Dean Constr. Co.**, R.R. 1, Belle River, Ont., LB $227,421, 3 structures and grading, paving approaches Hy. 40 Bear Creek (10 mi. north of Chatham) Maxwell Creek (12 mi. north of Chatham) and Big Creek Bridge No. 5. Contract 59-98.

▲ **Orsini Constr. Ltd.**, 363A Rogers Rd., Toronto, Ont., CA $1,243,634, rein. con., structural steel elevated structure Frederick G. Gardiner Expressway, TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids May 26, awarded June 3. CD 6-4, under LB.

B.G.I. Engineers & Builders Ltd., 7000 Cote des Neiges Rd., Montreal, Que., LB $455,582 (16 bidders), filtration plant, pumping station, etc., VARENNES, QUE. Village of Varennes, Village Hall, Varennes, Que. Bids May 18. CD 4-27.

▲ **Perini Ltd.**, 150 Kent St., Ottawa, Ont., LB $1,739,450 (9 bidders), aircraft hangar at Uplands Airport, UPLANDS, ONT. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids May 28. CD 5-12.

BUILDINGS—LB & CA

Diamond Constr. Co., Ltd., Box 100, Fredericton, N. B., CA $919,000 (17 bidders), PHYSICS and BIOLOGY BLDG., University Campus, FREDERICTON, N. B. University of New Brunswick, Fredericton, N. B. Bids May 29, awarded June 2. CD 5-8.

Bird Constr. Co. Ltd., 12525 127 Ave., Edmonton, Alta., LB $903,913 (5 bidders), various BUILDINGS for Dpt. National Defence (Navy), INUVIK, NORTH WEST TERRITORIES. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.

Wilkinson Constr. Ltd., 3596 St. Clair Ave. E., Toronto, Ont., CA Est. $500,000, 2 story addns. to 3 wings of WEST HILL COLLEGIATE, TORONTO, ONT., Scarborough Bd. Educ., 2472 Eglinton Ave. E., Toronto, Ont. Bids May 11, awarded June 1. CD 5-1.

▲ **Foundation Co. of Ontario Ltd.**, 1220 Bay St., Toronto, Ont., CA $7,000,000 (15 bidders) 4 story, mechanical penthouse, 200,000 sq. ft., steel frame, precast and poured concrete floors, poured concrete fdn. & bsmnt., exterior facing brick stone ENGINEERING BLDG., St. George St., TORONTO, ONT. University of Toronto, Simcoe Hall, Toronto, Ont. Page & Steele, 72 St. Clair Ave. W., Toronto, Ont., archts.; C. D. Carruthers & Wallace Consultants Ltd., 92 Yorkville Ave., Toronto, Ont., engrs. CD 6-5, under CA.

▲ **Jay Mar Constr.**, 1900 Lincoln Ave., Montreal, Que. Owner Builds. $1,000,000, 10 story, bsmnt., 48 x 117 ft., 88 suite APARTMENT BLDG., Pine Ave. W., MONTREAL, QUE. Harry Stillman, 4790 Roslyn Ave., Montreal, Que., archt.

▲ **Prudential Constr. Co.**, 445 Jean Talon St. W., Montreal, Que. Owner Builds. $1,200,000, 7 story, bsmnt., 102 x 137 ft., rein. con. frame, brick 77-suite APARTMENT BLOCK with GARAGE, Metcalfe Ave., MONTREAL, QUE. Charles Greiner, 3600 Barclay Ave., Montreal, Que., archt.; R. A. Eskenazi, 6819 [illegible], Montreal, Que., engr.

PUERTO RICO

HEAVY CONSTRUCTION—LB & CA

▲ PUERTO RICO P. Wks. Dpt. of Puerto Rico, San Juan.

Arturo Diaz Constr. Corp., Calle Tizol 58, Rio Piedras, Puerto Rico, CA $1,315,982, 5/8 mi. North Ave. Expressway between Calle Parque and Calle Villamil, San Juan. CD [illegible].

▲† **Harada Corp.**, 1248 Roosevelt Ave., San Juan, Puerto Rico, LB $1,987,962, building and utilities ACAN facilities, Radar Losey Field and Camp Salinas, PUERTO RICO. U. S. Eng., 71½ Fernandez Juncos Ave., San Juan, Puerto Rico. Tippetts-Abbett-McCarthy-Stratton, 375 Park Ave., New York 22, N. Y., U.S.A., engrs. Bids June 4. CD 5-7.

BUILDINGS—LB & CA

▲ **HRH Constr. Co.**, 579 5 Ave., New York, N. Y., U.S.A., CA Est. $4,500,000, 550,000 sq. ft. cigar FACTORY, PUERTO RICO. Consolidated Cigar Corp., 67 W. 44 St., New York, N. Y., U.S.A.; Lockwood Greene Engineers, Inc., 41 E. 42 St., New York, U.S.A., engrs.

AMERICANS ABROAD

BUILDINGS—LB & CA

▲ **Fluor International (Fluor Corp. Ltd.)**, 2500 South Atlantic Blvd., Los Angeles, Calif., U.S.A., and **Utah Australia Ltd. (Utah Constr. Co.)**, 144 E. Broadway, Salt Lake City 1, Utah, U.S.A., CA $28,000,000 PETROCHEMICAL PLANT, Altona, near Melbourne, AUSTRALIA. Standard-Vacuum Oil Co. (Standard Oil Co. N. J.), 30 Rockefeller Plaza and Socony Mobil Oil Co., 150 E. 42 St., both New York, N. Y., U.S.A.

COMMENT from the BUTLER ENGINEER

Of a new baby's birth . . . and Ready Mix on the Moon

A new baby is born and not only that, but is born in full maturity — completely adult and functioning well. It's the Concrete Plant Manufacturers Bureau of the National Ready Mixed Concrete Association. For short it's called CPMB. Remember it, for it will be of great importance to the Ready Mixed industry.

The CPMB is comprised of Butler Bin Co., and six other manufacturers of concrete plants.

The Bureau is counseled by Vince Ahearn, the highly respected Executive Secretary of the NCMA, and Ken Tobin has been made Executive Secretary of the CPMB.

The entire purpose is to set up approved designs, specifications and standards. Nomenclature too, is to be standardized, for this is an area which at times has been pretty cloudy. In other words, to obtain an exact definition of "automatic batcher, semi-automatic, manual" and many other technical terms.

The whole effort definitely redounds to the benefit of the producers of Ready Mixed Concrete.

Of great significance is the high degree of automation in Road-builders and Ready Mix Plants designed today. NOT very long ago an order for an automated plant was, as the booksellers say, "Excessively rare." Now an order for a manual plant makes everyone wonder what the Sam Hill it's to be used for.

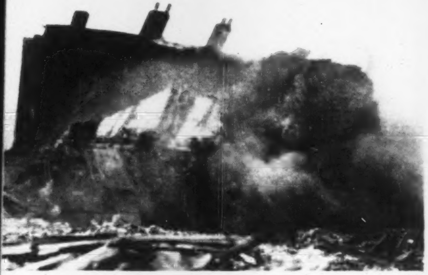
Today we're momentarily expecting someone to say "Look, I'm in the market for a plant to batch concrete on the moon."

Well, we haven't one quite as portable as that — yet — but we will when there's enough demand.

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

CIRCLE T-5 READER SERVICE CARD



TD-24 king-sized drawbar pull cables down a building.

TD-15 Four-in-One keeps 17 trucks "cycling"...

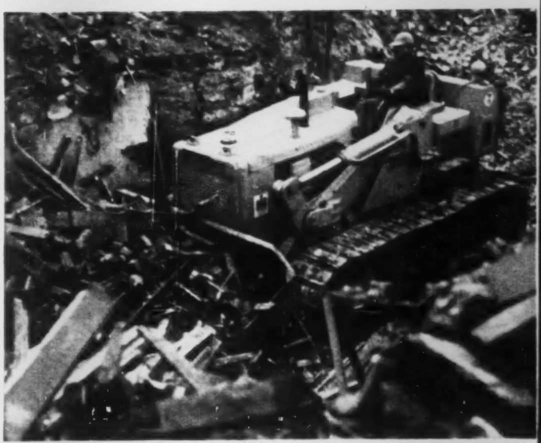
on slum clearance project!

Mass-production clearance of slum area buildings, at minimum cost, is a profitable reality—for Richard E. Harder Contracting Company, St. Louis, Missouri.

The contractor cables the old buildings down with an International TD-24—mauls them to bits with cranes and the "24." Then he "turns" the International Drott TD-15 Four-in-One loose on them—and the debris-loaded trucks (17 of them) start "cycling!"

Harder Contracting Company began loading out with a Skid-Shovel bucket—soon switched to the 4-in-1 to get capacity-boosting, money-saving multi-machine utility! Now the TD-15 Four-in-One, under one-man control, doubles for a whole spread of "big-ticket" rigs!

It gets 115 heavy-duty hp. from its smooth-running 6-cylinder diesel engine—to "push home" the bucket in "solidified" debris. It's got 39,200 lbs. of pry-over-shoe break-out action to excavate "anchored" materials. And the operator simply moves the "machine-selector" lever to also get clamshell action to "clamp" on to hard-to-handle, wood-and-masonry debris—plus versatile dozer and "carry-type scraper" performance!



Then the TD-15 "horses" in and heaps bucket.

See what it means in profit-earning capacity to switch machine actions instead of machines—to handle materials and conditions that frustrate old-style "single-action" rigs! Prove that exclusive, shock-swallowing Hydro-Spring adds operating comfort—prolongs equipment life. See your International Drott Distributor for a 4-in-1 demonstration!

Exclusive 4-in-1 clamshell bottom-dumping, quickly heap-loads a big truck. Fast TD-15 Shuttle-Bar forward-reverse control speeds 4-in-1 loading cycles!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL HARVESTER

INTERNATIONAL®
DROTT

VIBRATION & NOISE CONTROL NEWS

FROM THE APPLICATION ENGINEERING DEPARTMENT OF THE KORFUND COMPANY, INC.

RESILIENT MOUNTING CUTS COSTS, SIMPLIFIES HEAVY EQUIPMENT INSTALLATION ON U.S. CAPITOL HILL

Korfund Steel Spring Mounts

absorb vibration and convert sudden shock loads to harmless, gradually applied forces. Their high isolating efficiency is due to the greater static cushions they provide. Standard Vibro-Isolators give up to 2" of cushion, special units up to 10" or more, compared to about 1/4" for other materials. Yet, in every case, dynamic motion is imperceptible. And, unlike other materials, their performance can be accurately predetermined, eliminating costly trial and error.

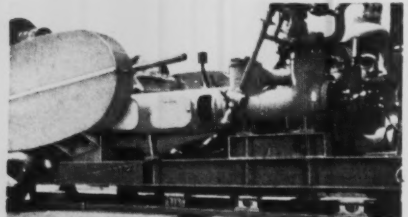
Their proven effectiveness for heavy machinery installations makes it unnecessary to add extreme safety factors when figuring dynamic loading of structures and soil. Foundation costs are cut, installation simplified.

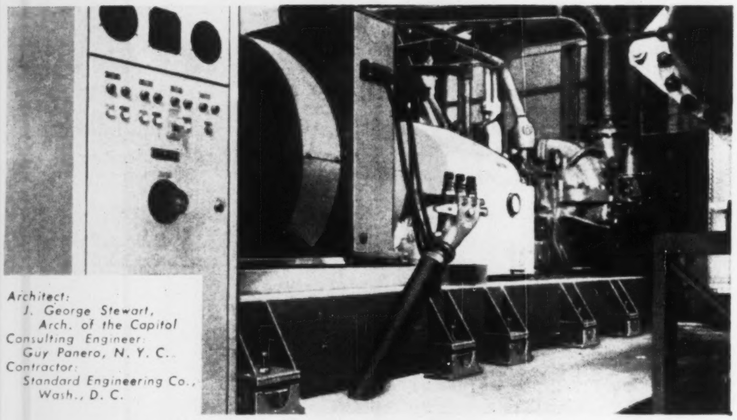
Oil Well on a Movie Lot Brings Soft Mountings Into the Picture

On the Paramount Studio lot pumping oil is good business—but it can't be permitted to interfere with the main job of making pictures. Yet the two horizontal slush pumps, for driving mud and sludge from the wells are prime sources of disturbance and can induce severe vibration, tremor and soil-borne noise that would ruin operations.

Floating each of the 64,000-pound pumps on twelve Korfund spring mounts was the quick and economical answer to the studio's noise and vibration problem. These units reduce dynamic loading of the supporting structure or soil bed—in some instances up to 99%—thus eliminating the need for special foundations.

Whether the problem is a sludge pump or centrifuge, a pulverizer or an extractor, chances are Korfund has already solved it.





Architect:
J. George Stewart,
Arch. of the Capitol
Consulting Engineer:
Guy Panero, N. Y. C.
Contractor:
Standard Engineering Co.,
Wash., D. C.

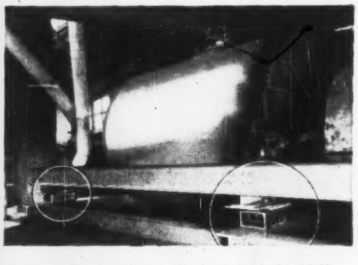
Modernization program for the power plant on the U. S. Capitol Hill, Washington, D. C., called for replacement of outdated refrigeration machines with units weighing almost three times as much. Photo shows one of the four York 2200-ton centrifugal machines installed to meet increased cooling demands. Because no additional piles could be driven to support the increased load or alter the natural frequency of the foundation, the total suspended weight of 210,163 pounds of each machine was floated on 15 Korfund resilient steel spring machine mounts. Using stock mounts and sound insulation pads, the natural frequency of the isolation system was held to 40% below the disturbing machine frequency—the required specification—and permanent elimination of vibration and noise was achieved—at less than 0.8% of the equipment cost!

Faced with tough machinery installations? It will certainly pay you to talk to the Korfund engineer in your city.

90,000 Pound Pebble Mill "Floats" on Upper Floor

For best layout and gravity flow of materials, engineers for a large processing company installed this pebble mill high in the building. If rigidly mounted, the cost of special foundations or structural reinforcement would wipe out savings in materials handling, without guaranteeing freedom from dangerous vibration.

Korfund engineers used eight steel spring mounts to support the mill and its 21,000 pounds of charge. Instead of costly structural alterations, only a light steel platform was required as a machine base, yet vibration and shock loads into the building structure were completely eliminated.



Better plant layout, reduced installation costs, and prolonged equipment life are just some of the benefits of Korfund vibration control. Why not write Korfund for the full story?

FOR MORE DATA
OR SPECIFIC
RECOMMENDATIONS
WRITE TO KORFUND
FOR BULLETIN #67

THE KORFUND COMPANY INC.
48-23M Thirty Second Place • Long Island City 1, New York

Over half a century of VIBRATION • SHOCK • NOISE / CONTROL & MEASUREMENT
Vibration & Shock Isolators • Flexible Connectors • Vibration Instruments • Acoustical Products

←CIRCLE U-3 READER SERVICE CARD CIRCLE U-4 READER SERVICE CARD CIRCLE U-7 READER SERVICE CARD→

This Cedarapids CHALLENGER

AVERAGES 500 TONS PER HOUR

$1\frac{1}{2}''$ minus material — 35% crushing

Want lowest cost per ton?
buy Cedarapids
Built by IOWA

Specifications for this big highway job in Montana

FOR BASE COURSE	
1½" minus	100%
No. 4 Sieve	25% to 60%
No. 200 Sieve	less than 15%
FOR TYPE "A" TOP COURSE	
¾" Sieve	100%
No. 4 Sieve	40% to 70%
No. 10 Sieve	25% to 55%
No. 200 Sieve	2% to 10%
Dust ratio less than 60% minus 4/10, at least 8%	
FOR COVER MATERIAL	
⅜" Sieve	100%
No. 4 Sieve	9% to 50%
No. 10 Sieve	0% to 8%
No. 200 Sieve	0% to 2%

Here's the plant with the capacity and versatility to handle the big jobs, like Albert Lalonde Co's highway contract near Wolf Point, Montana. The revolutionary Twin Jaw Primary, with 40% to 100% greater capacity than same-size single jaw crushers, makes possible production like Lalonde's 500 tph average . . . or the 640 tons per hour of 1" minus (25% crushing) produced on a recent Arizona highway job! And Challenger versatility permits meeting the toughest specs. You get 1 to 4 sizes, 2" down to ¼" fines . . . 100% fractured material, or blended.

The Cedarapids Challenger is a big producer in every way except in cost. Users of Twin Jaw Crushers consistently report up to 5 times longer jaw life than from single jaw crushers. Think of getting 500 or 600 tons of specification material every hour with less maintenance and operating cost than with most lower capacity plants.

Would you like more information about this single portable plant that gives you tonnages you'd ordinarily need two or more units to get? Send for details or see your Cedarapids Dealer today.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

FIND OUT WHAT
THE CHALLENGER
CAN DO ON YOUR JOB
send the coupon ▶

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa

Gentlemen: Please send Bulletin CH-1, and complete details about the big-capacity Cedarapids Twin Jaw Challenger.

Name____________________ Title____________

Company____________________________

Address____________________________

City____________________ State____________

TRU-MIX
CONCRETE
INC.
BE. 4-5351
187

Walter Ware, president and general manager, Tru-Mix Concrete, Inc., Portland, Oregon

FLEET OWNER REPORTS...

"NEW UNION 7600 GASOLINE IS MAKING MONEY FOR US"

"Our records prove New Union 7600 Gasoline is making money for us—

"**Better performance** is the unanimous opinion of our drivers. New 7600 Gasoline is giving better-than-ever performance throughout our fleet of Internationals and Diamond Ts. Greater power in every gear, fewer downshifts, mean more trips per unit per day.

"**Increased mileage** was noted immediately after we switched to New 7600. Fuel consumption dropped significantly when engine ignition was advanced to take advantage of its higher octane rating.

"**Reduced maintenance costs** are immediately apparent, too. Our shop superintendent reports New 7600 is cleaner-burning. Carbon deposits in the combustion chamber, and replacements of fouled plugs are the lowest in our 12-year operational records."

As Walter Ware and other Western truck fleet operators have discovered—Union's New 7600 Gasoline is *powered like a premium but priced like a regular.*

New 7600 has the highest octane rating of any regular in the West . . . high enough to give knock-free performance to 4 out of 5 vehicles on the road.

And more: New 7600 contains Union's exclusive additive NR76 to keep carburetors cleaner, free from gum.

New 7600 is now available generally in the West. Contact your Union Oil representative for immediate delivery.

UNION OIL COMPANY OF CALIFORNIA 76

UNION OIL CENTER, LOS ANGELES 17, CALIFORNIA, U.S.A.

Bids—Low Bids—Contracts—Third Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS
June 23 Massachusetts

BUILDINGS—LB & CA

▲ John Bowen Co., Inc., 173 Boston St., Dorchester, Mass., LB $1,380,400, HOSPITAL addn. of Surgical and Medical Wing LOWELL, MASS. Lowell General Hospital, 295 Varnum Ave., Lowell, Mass. Bids June 9. CD 5 19.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
June 23 Maryland July 1 New Jersey
July 16 New York July 17 Pennsylvania

STREETS AND ROADS
June 23 Maryland June 25, July 1 New Jersey
July 16 New York July 17 Pennsylvania

HEAVY CONSTRUCTION—LB & CA

▲ NEW YORK—State Dpt. P. Wks., State Office Bldg., Albany, N. Y.—Torrington Constr. Co., Inc., 116 E. Main St., Torrington, Conn., CA $4,482,505, est. $7,430,000, [illegible] 24 ft. variable width 7.25 mi., misc. work 0.07 mi., [illegible] 2.19 mi. [illegible] conc. 1.72 mi. b. conc. and 2.41 mi. [illegible] 10 hy. sep. structures comp. [illegible] beams 3 span 130 ft., 3 span 130 ft., 3 span 126.5 ft., 3 span 196.5 ft., 4 span 214.5 ft., 3 span 127.1 ft. and 3 span 133 ft.; 7.32 mi. (6.32 [illegible] Rte. 502: Hudson River to Gurney Lane) [illegible] Contr. FISH-59-9, Int. Tour. Rte. 87, Warren Co.

N. Y.—Harrison & Burrows, Inc., 507 Summit Ave., Jersey City, N. J., CA $1,052,367, est. $1,197,000, [illegible] Type 2A paving, comp. steel girder bridge 5 spans total 591 ft.; 0.78 mi. city of Syracuse, Bear St. Arterial Hy. Proj. U-1154 (1), Contr. FAC 59-1, Onondaga Co. Bids May 15, awarded June 8. CD 6 15, under LB.

▲ Yuba Consolidated Industries, Emeryville, Calif., CA $2,114,546, superstructure work on Ohio St. Bridge BUFFALO, N. Y. City, City Hall, Buffalo 2, N. Y. Bids June 4. CD 6 10, under LB.
McLain Constr. Div., Olsker-McLain Industries, 275 Mayville Ave., Kenmore, N. Y., CA $1,030,592, substructure for Ohio St. Bridge, Buffalo, N. Y.). Bids May 21. CD 5 27, under LB.

BUILDINGS—LB & CA

▲† Green Manor Constr. Co., 380-390 West Middle Turnpike, Manchester, Conn., CA $4,377,668, 270 unit Capehart HOUSING, Griffiss Air Force Base, Section 2, ENG-30-635-59-324, ROME, N. Y. Base Procurement Office, Griffiss Air Force Base, Rome, N. Y. Bids May 12. CD 5 21, under LB.

▲ Terminal Constr. Co., P.O. Box [illegible], Dover, Del., CA $23,344,000, [illegible] Capehart HOUSING, McGuire Air Force Base [illegible] WRIGHTSTOWN, N. J. Base Procurement Office, McGuire Air Force Base, Wrightstown, N. J. Bids May [illegible]. CD 6 3, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
June 26 Tennessee

STREETS AND ROADS
June 26 Ketucky, Tennessee

BUILDINGS—LB & CA

▲† Virginia Engineering Co., [illegible] 29th St., Newport News, Va., LB $2,527,000 (7 bidders), [illegible] except passenger elevators, United States POST OFFICE, [illegible] No. [illegible] Proj. No. 14093, [illegible] PORTSMOUTH, VA. Public Buildings Service, Region [illegible] Bldg., General Services Admin., 7th and D Sts., S.W., Wash. 25, D. C. Bids [illegible] CD 6 2[illegible]

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
June 24 Michigan

STREETS AND ROADS
June 24 Michigan June 30 Indiana

BUILDINGS—LB & CA

▲ Perini Corp., [illegible] Ave., Framingham, Mass., CA $3,400,000, CHEMICAL RESEARCH BLDG., CHICAGO, ILL. Illinois Institute of Technology, Armour Research Foundation, 10 W. 35th St., Chicago, [illegible] Bids May 15. CD 5 27.

▲† J. W. Bateson Co., Inc., 10130 Monroe Dr., Dallas, Tex., CA $5,703,600, 360 unit Capehart HOUSING No. 3, K. I. Sawyer Air Force Base, MARQUETTE, MICH. Base Procurement Office, K. I. Sawyer Air Force Base, Marquette, Mich. Bids May 7. (Correction—contractor) CD 6 11, under CA.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
June 25 Missouri July 16 South Dakota

STREETS AND ROADS
June 23, July 2 Kansas June 25 Missouri
July 16 South Dakota

HEAVY CONSTRUCTION—LB & CA

▲ Fred Weber Contractor, Inc., 7929 Alabama Ave., St. Louis 11, Mo., CA $3,626,116, est. $4,650,000, installing 18 [illegible] 78-in. high pressure steel water mains from Chain of Rocks Waterworks Plant to Bissell's Point and Baden Pumping Stations, ST. LOUIS, MO. City, Bd. P. Service, 304 City Hall, St. Louis 3, Mo. Bids June 2. CD 6 8, under LB.

▲ Morrison-Knudsen Co., Johnson, Drake & Piper, Inc., Paul Hardeman, Inc. & Olson Constr. Co. and F. E. Young, 111 West 5 St., Los Angeles, Calif., LB $28,526,750 (7 bidders), Lowry Air Force Base Technical Facilities 2A, 2B and 2C, ENG-25-066-59-[illegible] DENVER, COLO. U. S. Eng., 1709 Jackson, Omaha, Neb. Bids June 10. CD 5 25.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
July 1, 22 California

STREETS AND ROADS
July 1, 2, 22 California

BUILDINGS—BA

▲† Ariz.—Fort Huachuca TECHNICAL—BA 6 30—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. technical bldg. (final increments) at Army Electronic Proving Ground. ENG-04-353-59-95. $1,500,000. CD 6 5.

HEAVY CONSTRUCTION—LB & CA

▲ CALIFORNIA—State Div. Architecture, 1120 N St., Sacramento. Bids opened 6 10.

A. Teichert & Son, Inc., 1931 Stockton Blvd., Sacramento, Calif., LB $2,083,222 (7 bidders), [illegible] widening U.S. Hy. 40 to convert 3.4 mi. from 4 lane expressway to 6 lane freeway between 0.2 mi. west of Solano-Yolo Co. line and 1 mi. east of Davis, III-Sol-Yol-6-A, Yolo and Solano Counties. CD 5 13.

▲ MacDonald & Kruse Contractors, Box [illegible], 7540 Wheatland, Sun Valley, Calif., CA $2,861,125, storm drain, [illegible] Ave. Unit 2 and Proj. 17, Michigan Ave. Storm Drain Unit 3, Whittier, Santa Fe Springs [illegible] excavating, reinforced conc. rectangular channel and [illegible] box conduit and installing same, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids May 29. CD 6 4, under LB.

▲† Merritt-Chapman & Scott Corp., 261 Madison Ave., New York, N. Y., CA $23,985,564, Cougar Dam [illegible] 59-170, OREGON. U. S. Eng., 628 Pittock Block, Portland, Ore. Bids June 3, awarded June [illegible] CD 6 9, under LB.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS
June 24, July 8 Ontario

HEAVY CONSTRUCTION—LB & CA

▲ NEW BRUNSWICK and QUEBEC—Dpt. P. Wks., [illegible] Bldg., Ottawa, Ont.; Prov. Dpt. P. Wks., Parliament Bldgs., Quebec City, Que. and Prov. Dpt. P. Wks., [illegible] Bldg., Fredericton, N. B. Bids [illegible]

Canadian Bridge Co. Ltd., [illegible] Walker Rd., Walkerville, Ont., [illegible] $2,956,224 [illegible] superstructure of [illegible] bridge between Pointe [illegible], Que. and Campbellton, N. B. spanning the Restigouche River [illegible] Campbellton, N. B. and [illegible] Pointe, Que. CD 6 [illegible]

▲ McNamara Quebec Ltd., [illegible] Montreal, [illegible] The Key Constr. Inc., Deschamps & Belanger Ltd., [illegible] Montreal, Que., LB $8,319,797, [illegible] MONTREAL [illegible] West [illegible] Bldgs., Ottawa, Ont. [illegible] Montreal, Que. [illegible] Bids Apr. [illegible] CD 6 9.

BUILDINGS—LB & CA

▲ Girdler Process Equipment Div., Chemetron Corp., [illegible] Broadway, Louisville, Ky., CA [illegible] $4,000,000 [illegible] PLANT, LETHBRIDGE, ALTA. [illegible] Bank of Nova Scotia Bldg., Lethbridge, Alta.

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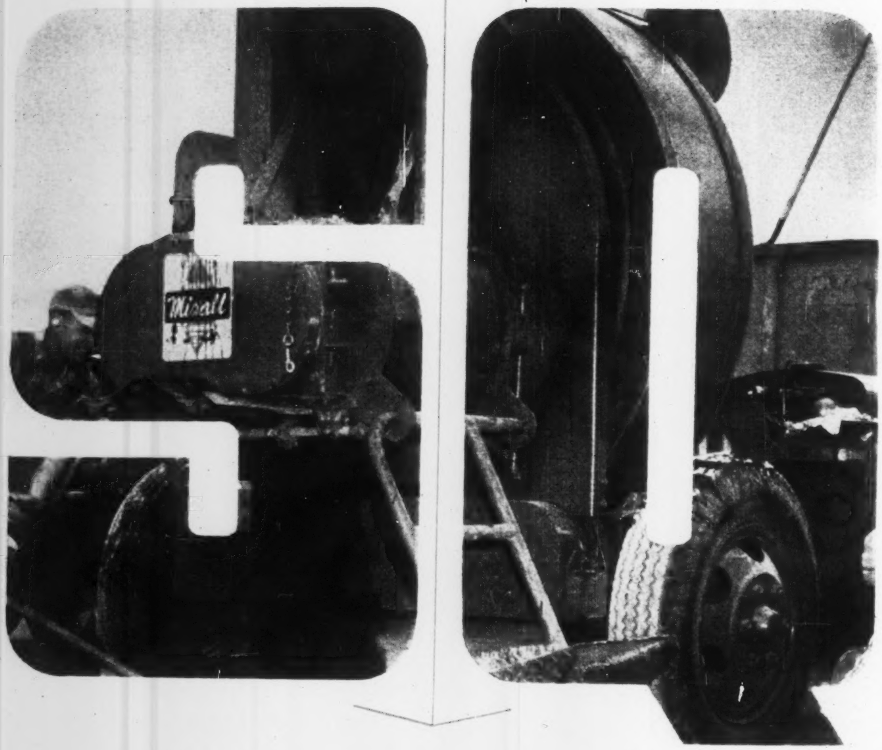

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The Tousey Duracote line has always meant a tough, durable, long lasting film with the ability to resist rust, corrosion and extreme weather conditions—and now, with this improved formulation you gain half again as much protection for your products. Your present finish can be duplicated in S Q Duracote . . . both in color and method of application.

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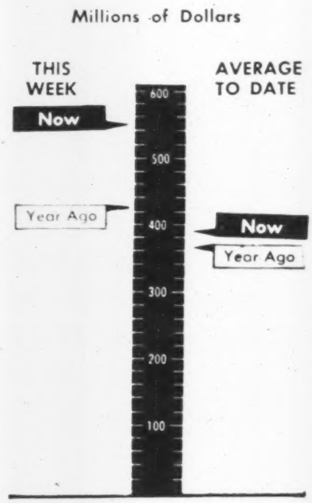
Construction Scoreboard

CONTRACTS ...



AMOUNT OF CONTRACTS LET

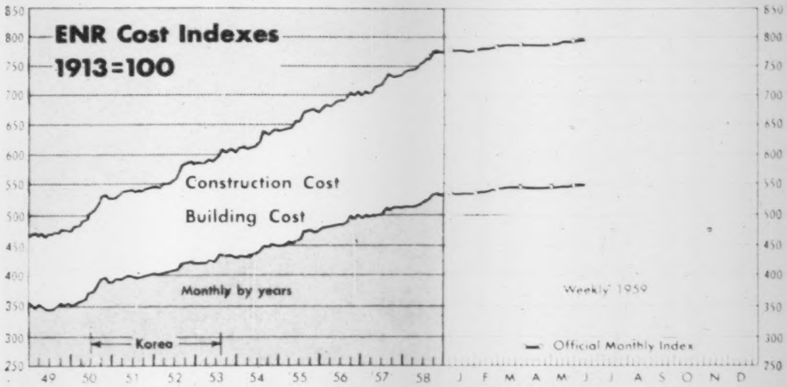
	This Week	Cum. 25 wks 1959	Chge '58-'59
	millions		%
ALL Heavy Constr.	$546.1	$9,855.9	+ 8
By Ownership			
PRIVATE	228.0	4,780.9	+18
PUBLIC	318.1	5,075.0	0
State & Municipal	184.6	3,548.3	− 6
Federal	133.5	1,526.7	+14
By Type of Work			
PUBLIC			
Waterworks	9.1	207.3	+36
Sewerage	28.6	313.6	+ 7
Bridges*	20.5	291.7	+ 8
Highways	68.7	1,471.8	+ 2
Earthwork, Waterways	33.8	410.4	−26
Buildings, Excl. Housing	53.5	1,308.1	+ 5
Housing	54.9	384.6	−29
Unclassified	49.0	690.6	+13
PRIVATE			
Buildings			
Mass Housing	133.2	2,195.9	+19
Commercial	55.4	1,082.2	+10
Industrial	35.5	1,290.6	+33
Unclassified	3.9	209.1	−13

*Includes private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

CAPITAL . . .

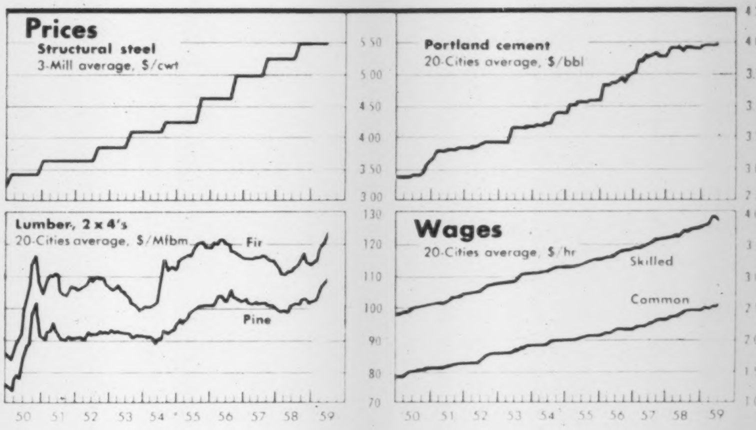
New Capital For Construction	Week of June 11	Cum. 24 wks 1959	Chge '58-'59
	millions		%
Corporate Securities	$122.5	$2,049.2	−22
State and Municipal:			
All Except Housing	70.6	3,039.5	−12
Housing	....	30.6	− 9
Federal Loans	2.7	66.6	−24
Federal Aid	....	18.0	...
Total Nonfederal	$195.8	$5,203.9	−16
Federal Appropriations:			
Projects in U. S.	....	38.3	−94
Outside U. S.	....	....	....
Total New Capital	$195.8	$5,242.2	−23



CURRENT COST INDEXES

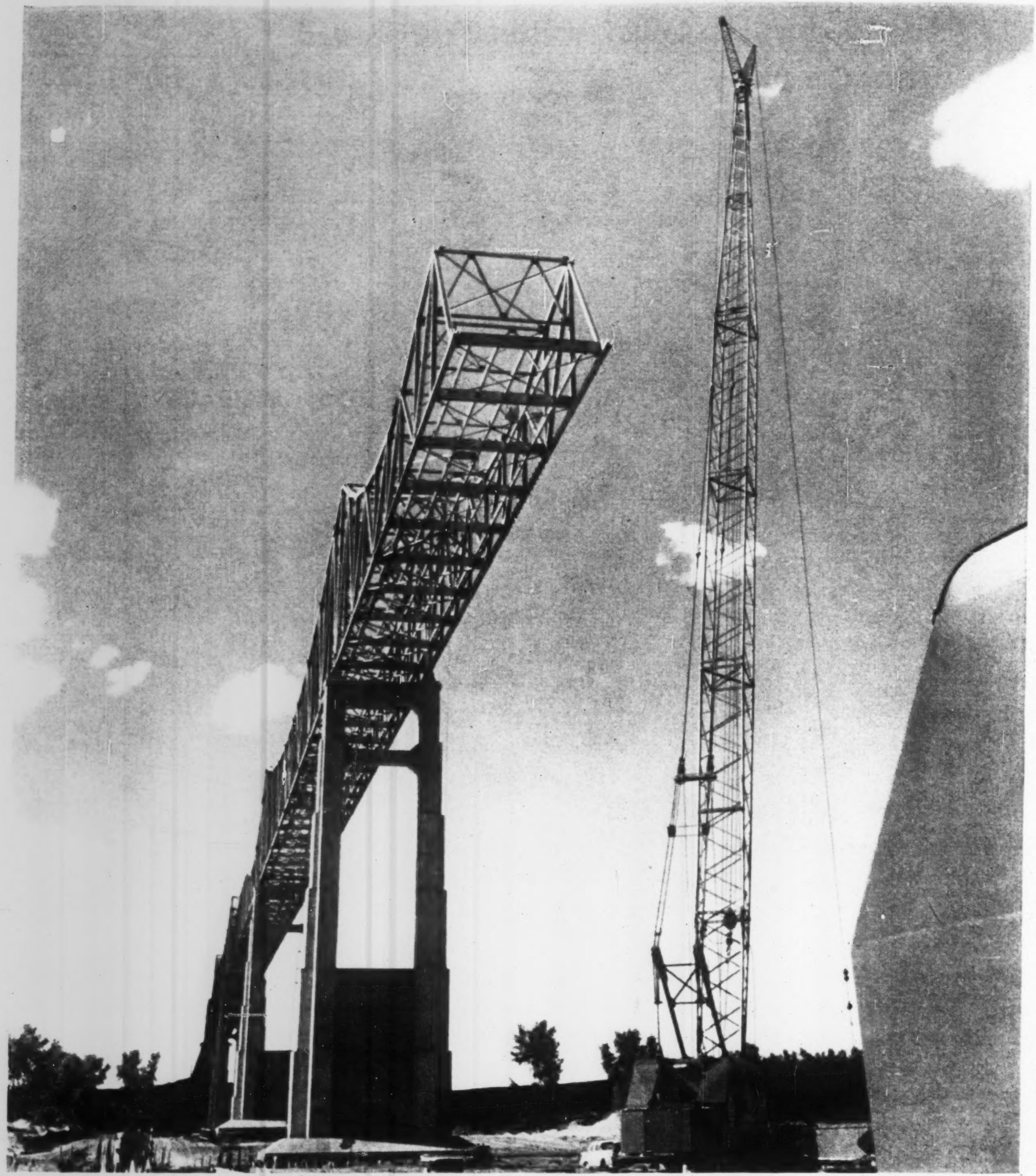
ENR INDEXES (1913=100), 20-cities' average	Week of June 11 1959	% Change from May 14 1959	% Change from June 12 1958
Construction Cost	798.03	+0.4	+5.3
Building Cost	549.10	+0.3	+5.2

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.030; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.



ENR COST INDEXES IN 22 CITIES, 1913=100

	Construction Cost			Building Cost		
City	June 1959	Percent Change from last Month	Percent Change from last Year	June 1959	Percent Change from last Month	Percent Change from last Year
Atlanta	594	0	+6.5	477	0	+3.5
Baltimore	711	0	+1.4	544	0	+3.2
Birmingham	624	0	+5.2	498	0	+3.8
Boston	832	+0.2	+4.9	560	+0.7	+6.1
Chicago	875	+0.3	+4.4	578	+0.5	+8.0
Cincinnati	790	0	+5.9	529	0	+5.4
Cleveland	919	+0.7	+8.2	551	0	+7.6
Dallas	573	0	+3.6	474	0	+3.3
Denver	742	0	+2.3	537	+1.7	+2.3
Detroit	962	+7.0	+12.9	599	+3.1	+9.9
Kansas City	793	0	+4.1	548	0	+4.0
Los Angeles	839	0	+3.1	552	+0.9	+7.4
Minneapolis	855	0	+4.5	564	0	+3.1
New Orleans	620	0	+4.9	499	+0.6	+4.6
New York	978	+0.6	+7.2	639	+0.9	+6.3
Philadelphia	804	0	+1.0	583	0	+2.5
Pittsburgh	840	0	+2.6	595	0	+3.8
St. Louis	891	+1.1	+6.0	590	+1.7	+5.7
San Francisco	824	0	+3.3	550	+0.9	+8.5
Seattle	836	+0.2	+6.0	499	+1.2	+6.2
U. S. 20 Cities' average	795	+0.6	+5.0	548	+0.7	+5.2
Montreal	610	0	+1.2	450	0	+0.2
Toronto	671	+3.4	+10.9	500	+1.4	+6.8



$9,000,000 worth of bridges at Forest City and Mobridge, S. D.

Designers: Bridge Division of the South Dakota Department of Highways; Basic design by Bridge Engineer, K. R. Scurr. Final design and details by Missouri River Bridge Section of the Bridge Division, consisting of Roy W. Johnson, Chief Designer, and Structural Designers, Allen Fladeboe and Elek Kirchner.

Resident Engineer: K. O. Long, for foundations

Substructure Contractor: Massman Construction Co., Kansas City, Mo.

Superstructure Contractor: John F. Beasley Co., Chicago, Muskogee, Dallas

Superstructure Steel Fabricator:
Vincennes Steel Division of Industrial Enterprises, Inc., Vincennes, Ind.

Girder Spans, Mobridge Bridge:
Mississippi Valley Structural Steel Co.

Biggest bridges between the Mississippi and the West Coast built solidly on USS Steel H-Piles

Bridges span South Dakota's Oahe Reservoir—cost less than estimated

THESE TWO BRIDGES at Forest City and Mobridge are hailed as the largest single engineering and construction projects ever carried on in South Dakota, with the exception of Oahe and Ft. Randall dams. The bridges are larger than any between the Mississippi River and the West Coast.

The Forest City Bridge is 4,583 feet long and the 26-foot roadway is 165 feet above the Missouri River bed. The total cost is approximately $4,715,000.

The Mobridge structure is 5,059 feet long, with a 26-foot roadway 140 feet above the river bed. The approximate cost is $4,471,000.

Both bridges were constructed at costs substantially lower than original estimates. A major factor contributing to maximum economy was an advance purchase by the state of about 5,500 tons of USS Steel H-Piles. The immediate availability of these pilings at the sites had a considerable influence on the bidding for both projects.

At the Forest City site, the 14-inch, 102-lb. USS H-Piles were driven to a maximum depth of 140 feet into Pierre shale using a steam hammer with 30,000 foot-pounds of energy. At the Mobridge site, the maximum length of piling is about 115 feet.

USS Steel H-Piles proved structurally and economically sound

The use of 5,500 tons of USS Steel H-Piles on these projects is further proof of their ability to provide a secure means of supporting foundations in unstable materials. They are readily handled in the field by ordinary equipment, are easy to splice, eliminate jetting, and withstand rough handling.

The great capacity of USS H-Piles for high unit loads, both vertical and horizontal, means fewer piles and fewer driving operations for a given load.

For more detailed information about the lasting safety and economy of USS Steel H-Piles for every type of foundation job, contact our nearest sales office.

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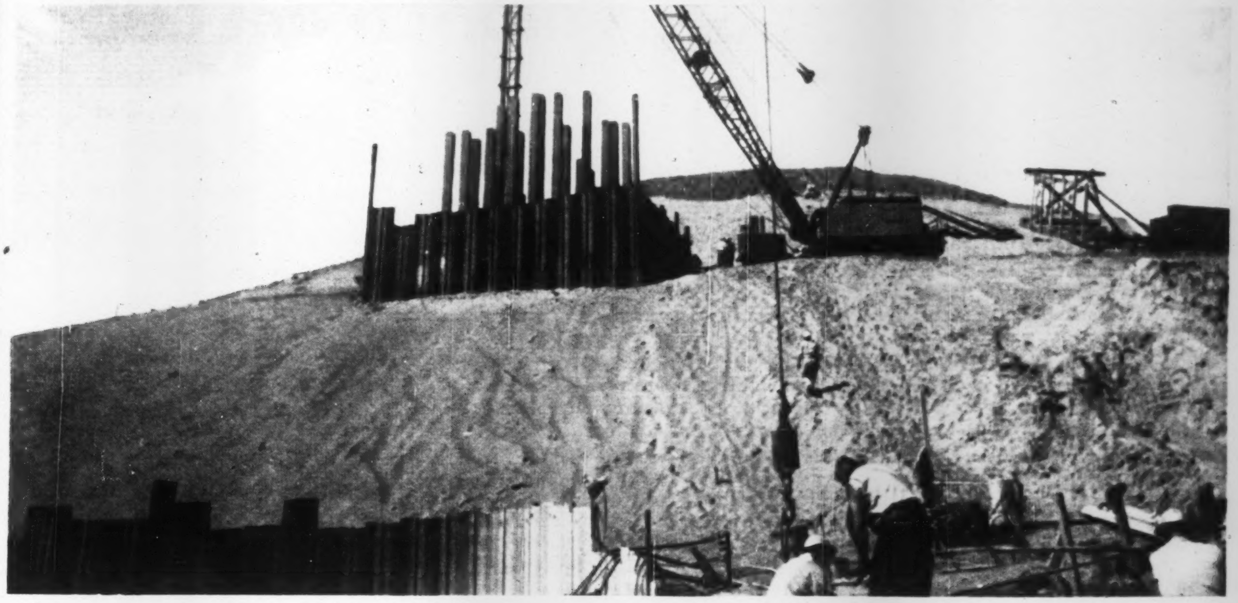
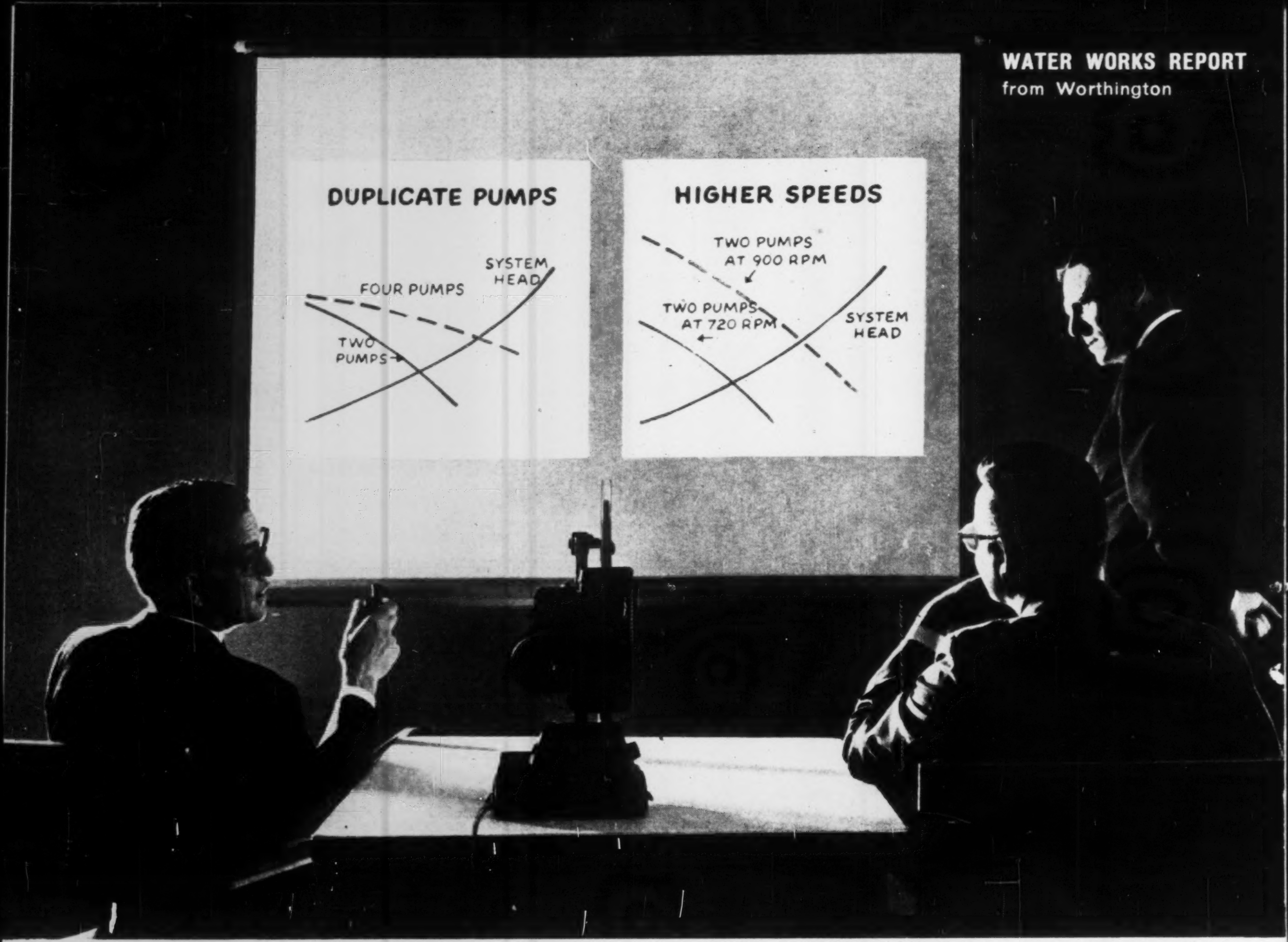
Mobridge and Forest City Bridges are similar in design and together take more than 8 thousand tons of fabricated steel and 5,500 tons of USS H-Piles.





WATER WORKS REPORT
from Worthington

Two ways of taking care of future demands for increased capacity are shown here. The chart on the left indicates the performance of 4 pumps operating in parallel. The chart on the right indicates the same conditions obtained with the use of 2 pumps operating at higher speeds.

DUPLICATE PUMPS OR HIGHER SPEEDS?

A discussion of the economics of multi-speed pumps for water works

Today, most engineers plan for expansion by providing space for duplicate pumps, or pumps that will operate in parallel giving increased capacity as water demand increases.

Another way of taking care of increased capacity is through the use of higher speeds. By providing for multi-speed operation in the future, it may be possible to save thousands of dollars. Spare parts, as well as maintenance costs, can also be reduced.

The charts above show how this can be done. Suppose your water works now uses two 60 hp centrifugal pumps. Sometime in the future you plan to increase capacity by one-third by adding two more pumps which will operate in parallel. The total cost of the four pumps and motors installed would be approximately $26,000.

This same increase in capacity, in some instances, can be accomplished by multi-speed pumping. If you initially made the proper provisions, you could later increase the speed of the two pumps from 720 rpm to 900 rpm. This would give you the necessary capacity increase of 33⅓%. And the total cost would be only $21,000, a saving of $5,000 or approximately 20%.*

It's not necessary to limit your thinking to two-speed operation. Possibly the most economic proposal for your system would be three or four-speed operation. All public water-supply systems are different and pumping equipment is affected by different capacities, suction conditions, and static and friction heads. Therefore, all factors must be known before deciding on the proper approach. This sort of planning, however, combined with the use of multi-speed pumping when appropriate, can save you large amounts of money.

Ask your consulting engineer about the merits of multi-speed pumping. He'll explain to you its many advantages. And for unbiased equipment recommendations, get in touch with Worthington. Worthington makes all types of pumps and drives and a complete line of engines, compressors, and auxiliary equipment.

For a reprint of an engineering discussion of multi-speed pumping for water works, write to Worthington Corp., Section 105-4, Harrison, N. J. In Canada: Worthington (Canada) Ltd., Brantford, Ont.

*Cost figures are estimated and conservative. No cost has been added for additional space required by the extra pumps.

WORTHINGTON

Housing: Aluminum Is Moving In

- **The major aluminum producers are going after the nation's housing market.**
- **Aluminum-faced homes are still a small part of the market, but the idea's spreading.**

There's a gleam in the eyes of home builders—the gleam of aluminum.

A few years ago most of the aluminum in American homes was in the pots and pans on the kitchen stove. Today aluminum shows promise of becoming the major building material in residential construction.

Though aluminum houses are still only a small percentage of new homes, their share of the market is fast increasing. Some 15,000 aluminum-faced houses are expected to be built this year, according to A. H. Williams, vice president of Reynolds Aluminum Sales Co. Only 500 were built last year.

The estimate may be conservative. One prefabricated-home manufacturer—National Homes of Lafayette, Ind.—expects half of the 30,000 or more homes it will sell this year to be aluminum-faced. Reynolds Aluminum Co. anticipates that builders will construct 3,000 custom units of aluminum this year.

Over-all, Reynolds predicts the use of aluminum in houses will increase 50% this year. In 1958, 130 million pounds of it went into home construction. This year, the estimate is for more than 200 million pounds.

Most recent entry in the field is Kaiser Aluminum and Chemical Corp., Oakland, Calif. Kaiser has introduced a house with an aluminum exterior, roof, doors, windows, hardware, ducts and roof gutters.

Another producer, Olin Mathieson Chemical Corp., New York City, will soon enter the race. Olin hired Carl Koch, Boston architect, to design a house utilizing aluminum to the greatest possible extent. The result will be out this fall.

Olin's entry into the market will bring the major domestic aluminum producers—Olin Mathieson, Reynolds, Kaiser and Aluminum Co. of America—into the drive to clad more of the nation's houses with aluminum. Alcoa began its aluminum-home promotion two years ago by introducing the "Care-Free Home," a unit that is specially designed for aluminum construction.

Reynolds is currently pushing an aluminum "House of Ease," ranging in price from $18,000 to $30,000. The market is not limited to this bracket, however. National Homes is producing aluminum houses from $8,500 on up. And although National Homes is now the leader in the production of aluminum houses, smaller manufacturers of prefabricated houses are entering the market, as are other segments of the building industry.

Two developments featuring aluminum houses are open on tracts near Hartford, Conn., an area steeped in New England tradition, where changes in home styles and materials are accepted slowly.

The Hartford developments are typical of the ready acceptance home buyers have given to aluminum homes.

Seven out of 10 prospective home buyers visiting the "House of Ease" indicated a willingness to pay the slightly higher initial cost of an aluminum home, reports Reynolds. Chief reason: Home owners can look forward to saving $6,000 in maintenance costs over the estimated 30-year life of an aluminum home, say the manufacturers.

Aluminum houses generally cost from $300 to $1,000 more than the comparable home built with traditional materials, one architect estimates. However, many aluminum house applications are now down to the cost of brick or high-quality wood, say the producers. And as aluminum applications are more widely used, the cost will drop further, producers add. They point to aluminum windows as an example.

The aluminum industry has already moved deep into markets once dominated by wood, copper, asphalt and asbestos products. Aluminum doors and screens are no longer a novelty; they are now commonly used in housing developments throughout the country. Aluminum gutters, insulation, ductwork, shutters and awnings are also prominent

The rapid growth in the use of aluminum siding and sidewalls marks a big break-through for the aluminum producers. "We estimate there is an average 50 pounds of aluminum per new home built," says John Jansson, a former architect now with Olin Mathieson Chemical Corp.

"Within five years we hope to hit an average of 1,000 pounds of aluminum per new home, chiefly through the increased use of aluminum as siding." Mr. Jansson says. The average aluminum house takes 625 pounds of siding.

Aluminum is used even more extensively by prefabricated-home manufacturers. National Homes' Viking averages 2,000 pounds of aluminum.

A spokesman for National Homes predicts that within five years aluminum will be the predominant material in prefabs. "Since January, when we started promoting aluminum-clad homes, our average has jumped from 600 pounds of aluminum per home to 3,000 pounds per home," he says.

Almost all major prefab producers are using or considering using aluminum. One big advantage is that aluminum allows a greater degree of prefabrication in the factory, resulting in less on-site labor.

National Homes is now using aluminum sidewalls composed of ⅜-in. gypsum, ½ in. glass fiber insulation, studs, ⅜-in. sheetrock and a laminated aluminum exterior. This is a big advance in the application of aluminum to home construction, but load-bearing panels are still considered experimental, for the most part.

Aluminum manufacturers are now trying to develop load-bearing panels as large as 8x16 ft. Such panels would be fabricated aluminum skins sandwiched around foam plastic or other types of cores, with aluminum windows and doors an integral part of the panel.

But the next breakthrough seems most likely to occur in aluminum roofing, which first appeared about four years ago. Ribbed aluminum and aluminum shingles are now available for roofing.

Last year construction was the biggest customer for aluminum, using one-fourth of all commercial sales—940 million pounds. Increased use of aluminum in residential construction—along with its growth in bridges and commercial buildings—will probably make construction an even bigger customer.

(*B&F continued p. 292*)

Business in Brief . . .

• Tight money squeezes—Homebuilders say tight money is beginning to cut into their profits. Competition prevents them from passing along to their customers the full impact of higher interest rates on building costs. Meanwhile, many banks are turning down some loan requests they might have okayed a few months ago.

• More Wanapum wampum—Public Utility District 2, Grant County, Wash., will offer $195 million of term and serial bonds on July 1. Proceeds from the bond sale will finance construction of the Wanapum Power Development.

• No dumping, please—The Canadian Construction Association complains that surplus American construction equipment, used to build U. S. bases in Newfoundland and Labrador, is being dumped on the Canadian market to the disadvantage of equipment distributors and contractors in that country.

• Aluminum production up—Rising demand and fear of a strike this summer is forcing producers of aluminum to raise production. Reynolds Metals Co. is going up to 100% of capacity, Aluminum Corp. of America, to 83% and Kaiser Aluminum and Chemical Corp., to a record 86%.

• Seaway contracts ahead—The U. S. and Canada will spend $500 million in future St. Lawrence Seaway construction, says N. R. Danielian, president of the Great Lakes-St. Lawrence Association. Additional waterway, harbor and port development is needed to realize the full potential of the waterway.

• No handouts, please—Cincinnati's Board of Education spurned an estimated $110,000 in federal matching funds for school improvements. Said the board's majority leader ". . . it sets a bad example educationally to ask for these federal handouts."

• Retainage stays high—Wisconsin's Gov. Gaylord Nelson vetoed a bill that would have lowered the percentage of progress payments withheld by municipalities from contractors on public works. Wisconsin law now requires withholding 10% of progress payments when a surety bond exists.

• Ohio building money—Ohio's legislature is considering a $97-million capital improvements bill to finance more than 500 projects in 1960 and 1961. Included is $24.5 million for new buildings in the Department of Mental Hygiene and Correction and $21.5 million for state college buildings.

Coming: $172 Million in Buildings

The General Services Administration will soon award $67 million in contracts for construction of 15 federal buildings. In addition, GSA received $105 million from Congress for 22 more federal building projects. Bid invitations for the latter will go out in the fiscal year beginning July 1.

The activity of GSA's Public Building Service is an attempt to catch up with federal building needs after a 20-year lapse in such construction (ENR Nov. 6, 1958, p. 21). PBS has a backlog of 67 projects totaling $715 million still to be let under its current building program.

PBS now has an active building program costing $920 million, including current construction totaling $204 million. Of this, $78 million including 19 major contracts was awarded in the past seven months.

The PBS program was delayed until 18 months ago by high interest rates on money borrowed for construction. Since then, Congress has speeded up the PBS program by authorizing construction funds from direct appropriations.

PBS reports bids received for recent jobs were averaging a little below estimate. An average of six or seven bids have been received per job.

Major federal buildings to be awarded soon are scheduled for:

Phoenix: $8.8 million.
Little Rock: $9 million.
St. Louis: $13 million and $7 million.
Richmond: $8 million.

Authorized for fiscal 1960 are projects in

Brooklyn: $15 million.
Houston: $16 million.
Salt Lake City: $10 million.
St. Paul: $8 million.
Charleston, W. Va.: $4 million.
Parkersburg, W. Va.: $3 million.

House Group Balks At Cutting Aid to Schools

Administration plans for cutting school aid to federal impact areas got no encouragement last week at hearings before a House education subcommittee.

Democrats and Republicans on the committee told Secretary of Health, Education and Welfare Arthur S. Flemming they had no intention of tampering with existing law. It works well despite its imperfections, they said.

Their words reinforced what the House had already made clear in its vote on HEW appropriations for next year. The House approved funds to cover the full cost of school aid authorized by present law, without any of the cuts called for by the President.

The Administration wants to slice $14 million off school construction outlays in the next year, reducing the budgeted cost from $61 million to $47 million. An even bigger saving is proposed for school operating grants, with an aimed-for reduction of $47 million in the $164 million currently required.

Present law has to be amended to make these savings possible. Suggested changes would help correct some imperfections in the law, committee members conceded. But the effect, they said, would be to cut aid that is now effectively taking care of a portion of a nationwide need for schools. The Administration would be doing more to help the situation by working on an acceptable compromise bill to assist school construction nationally, committee members observe.

The states that would be hardest hit by the Administration's proposed cuts are: Alabama, $541,000 cut; California, $4,978,000; Florida, $487,000; Georgia, $772,000; Indiana, $696,000; Maryland, $676,000; Michigan, $1,240,000; New Mexico, $491,000; Texas, $1,427,000; and Virginia, $808,000.

Private Housing Starts Dipped Slightly Last Month

Builders started 130,600 private housing units last month, according to the U. S. Bureau of Labor Statistics.

That's slightly under April's total, but still 29% better than last May and the third best May on record.

The dip brings the seasonally adjusted annual rate of private housing starts to 1.34 million—50,000 less than in March or April and 4% under the February high of 1.4 million. The five-month total, however, is 41% higher than estimated a year ago and beats the 1950 and 1955 peaks by 1%.

A cutback in Capehart housing forced public housing starts back to 3,400 units last month.

(*B&F continued p. 294*)

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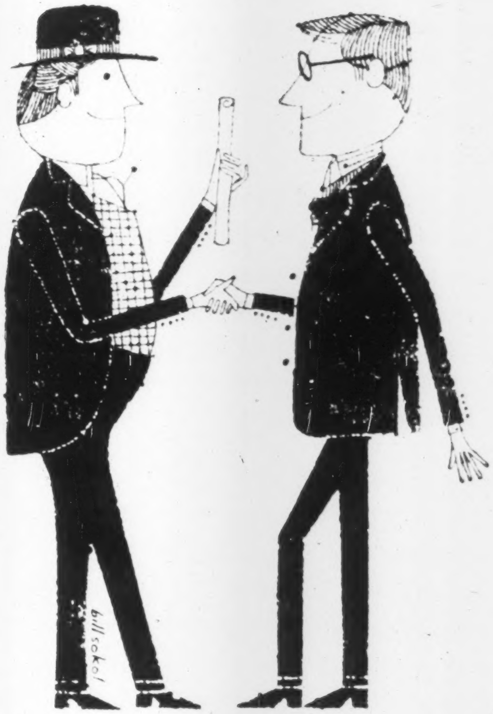

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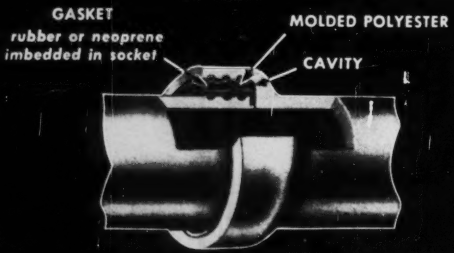

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Equipment Sales Up

Manufacturers now expect to top '58 sales by 24%

Construction equipment manufacturers have raised their 1959 sales forecasts again. They now expect to top 1958 sales by 24%. An earlier forecast for 1959 was a 21% gain in sales (ENR Mar. 26, p. 95).

Either forecast, if realized, will mean a record year in construction equipment sales.

The latest manufacturers' forecast pegs average sales for 1959 at 301 on the New Orders Index compiled by McGraw-Hill's Economics Department. The previous forecast for this year averaged 286, based on 1949 = 100. This compares with a revised index value of 242 last year and a value of 249 in 1956, when a record was set.

Orders for construction and mining equipment topped the manufacturers' forecast of 267 by 11% in the first quarter. The New Orders Index averaged 297, largest quarter on record for dollar volume of equipment sales.

Revised manufacturers' forecasts for the next four quarters are:

- **Second quarter, a record 321 and an 8% jump** above the first-quarter value of 297. Previous second-quarter forecast was 306.
- **Third quarter, a dip to 295** but still above the previous third-quarter estimate of 289.
- **Fourth quarter, a further drop to 291,** though still above the 285 previously forecast for this quarter.
- **First quarter, 1960, a 14% increase** to a new quarterly high of 333.

There are two reasons for these revisions: the first-quarter sales record and the boom in construction contracts.

New orders for construction and mining machinery in April were second only to the record high set in March this year. The New Orders Index dipped from 339 in March to 321 in April. But April order volume is 33% higher than a year ago. Moreover, contractors spent 31% more on equipment in the first quarter of 1959 than in the first four months of last year.

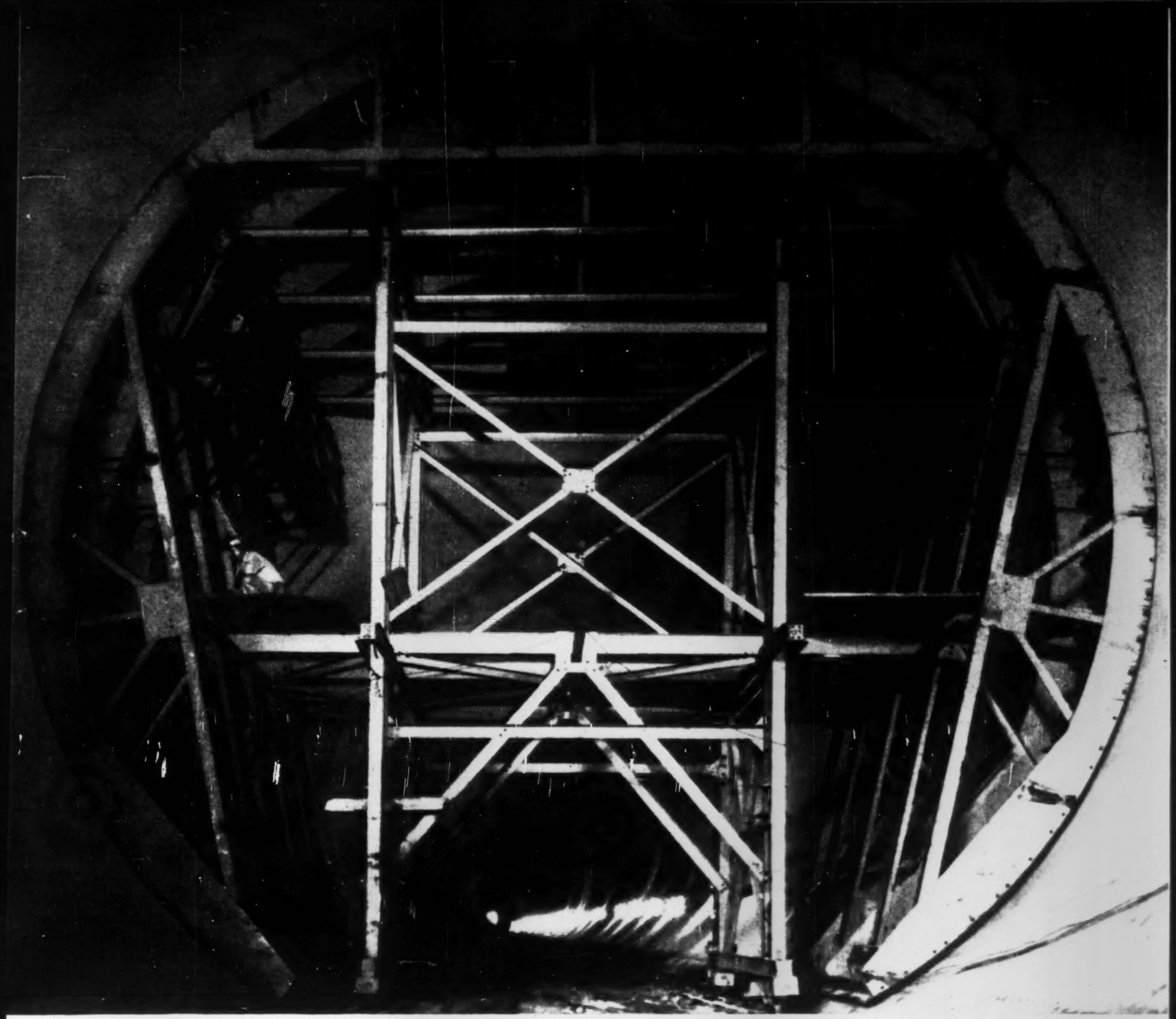
The booming pace of construction contracts in May, a record for the month, indicates contractors will continue to order record amounts of new equipment. The contract award index hit 313 in May, up 29% over April. This exceeds the peak month of the 1955-56 boom.

(You can expect a big rise in equipment prices this fall. See p. 86.)

(B&F continued p. 296)

CIRCLE Y-4 READER SERVICE CARD

CIRCLE Y-5 READER SERVICE CARD ►



60-foot long Blaw-Knox tunnel form in position inside east diversion tunnel at Glen Canyon Dam. Each linear foot of the 33-inch tunnel wall required 20 cubic yards of concrete. Blaw-Knox Forms consistently met accuracy requirements.

Blaw-Knox Steel Forms ease concreting of Glen Canyon Dam Tunnels

Two 60-foot long, 41-foot diameter, non-telescopic tunnel forms met required standards of accuracy in the concreting of 6,000 feet of diversion and spillway tunnels at Glen Canyon Dam on the Colorado River. Their special design permitted the lining of curved or tangent sections within radii as small as 165 feet.

A total of 140,000 cubic yards of concrete was used in constructing 33-inch thick tunnel walls. Preassembled outside the tunnel, the Blaw-Knox Forms were mounted on rails. After the form was placed, a series of hydraulic jacks expanded the unit to match the "A" line grade. Concrete was pumped into place, vibrated to eliminate honeycombing, and cured for 16 to 24 hours.

Merritt-Chapman & Scott Corporation, prime contractor for Glen Canyon Dam, employed a 20-man crew to set, strip, and reset the form. A specially designed Blaw-Knox screed was used to pave inverts of both tunnels. This method, combined with the accuracy of the Blaw-Knox Forms, pour after pour, helped to considerably reduce time and costs.

Blaw-Knox Steel Forms Consultation Service is available to contractors on all types of concreting. For more than forty years, Blaw-Knox Forms Engineers have made their experience available to enable contractors to save time and cut costs on dams, bridges, and tunnels. Contact us early in your planning for a profitable engineering contribution, or you may wish to write for a copy of technical report 2571 covering this project.

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Cement Site Fight

Kaiser's plans for plant stir row in Hawaii

Hawaii's cement shortage may be temporarily prolonged while two industrialists argue over the location of a cement manufacturing plant in the Honolulu area. Henry J. Kaiser, 77-year-old head of Permanente Cement Co., and Walter F. Dillingham, 74-year-old Hawaiian industrialist, are doing the battling.

At present, Permanente ships all of Hawaii's cement from California. Permanente recently revealed plans to start construction within five months on a $12-million Oahu cement plant with an annual capacity of 1.7 million barrels. Newly formed Hawaiian Cement Corp., in which Mr. Dillingham has an interest, has already started construction of a $12-million cement plant that will produce 1 million barrels annually.

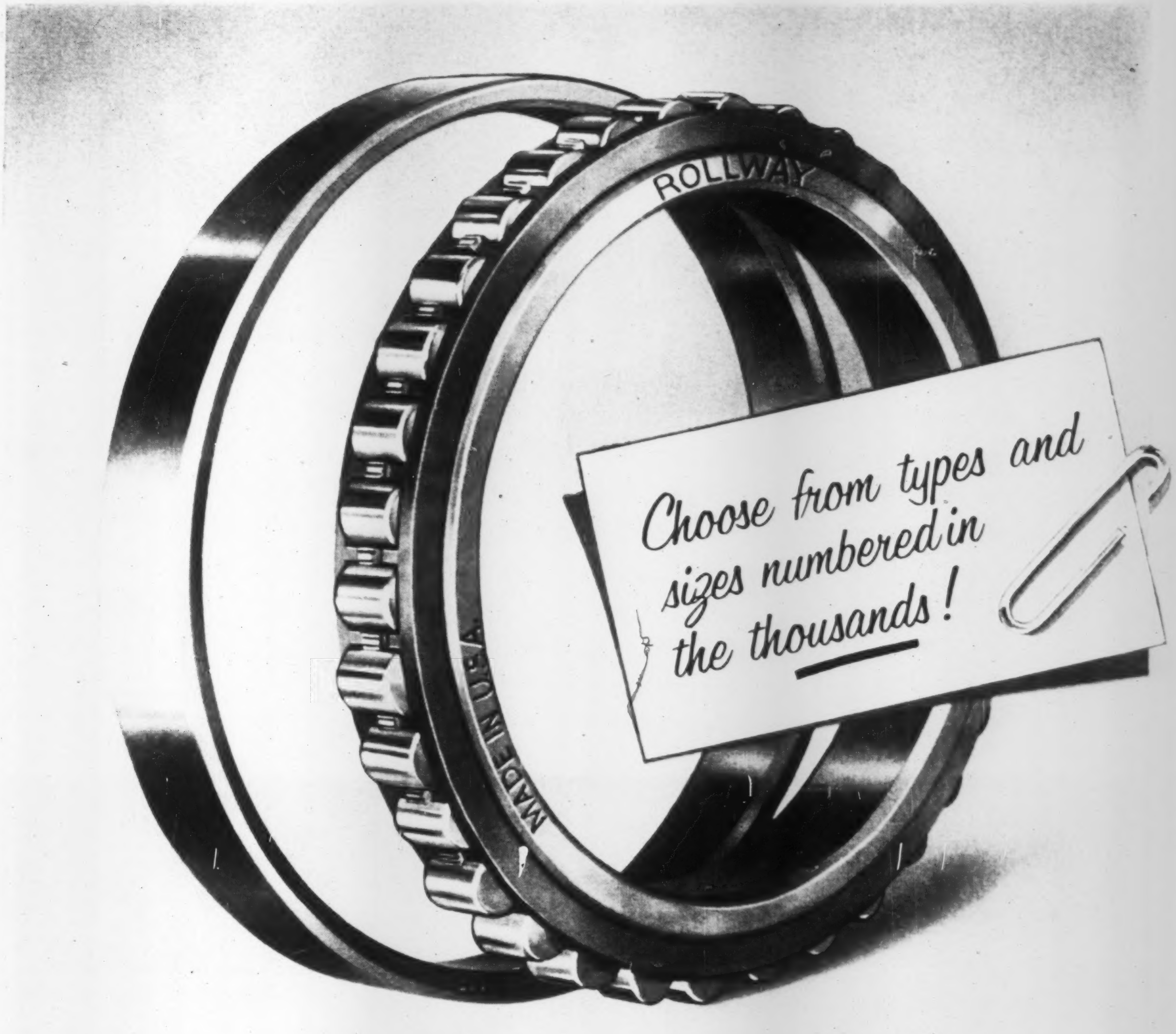
Conflict arose when Mr. Kaiser asked the Honolulu City Planning Commission to approve the site of the proposed Permanente facility. The site is not zoned for heavy industry and the commission delayed granting a variance until it considers a master plan for the area.

Mr. Dillingham and his associates plan a beach hotel and resort development near the site proposed for the Kaiser cement plant. They asked the commission to reject the Kaiser request on grounds that it would change the character of the area, making the resort impractical.

Mr. Kaiser reportedly has the support of most of the area's residents and owners except the Dillingham group. Now he is protesting the commission's delay. At a recent public hearing, Mr. Kaiser accused the Dillingham interests of underhanded attempts to kill his cement plant project. He said they were trying to protect their interest in competing Hawaiian Cement Corp., rather than the character of the area. He threatened to abandon the site for another location if the delay continues.

Mr. Dillingham retorted that his resort plans were delayed since last November, awaiting completion of the commission's master plan, and there was no reason why the delay should be waived for Mr. Kaiser. Mr. Dillingham said his $125,000 investment in Hawaiian Cement Corp. is negligible, compared to his interest in the $8-million to $9-million resort.

An ironic note: The Hawaiian Cement Corp. plant now under construction will be built with Permanente cement, the only cement now available in the islands.



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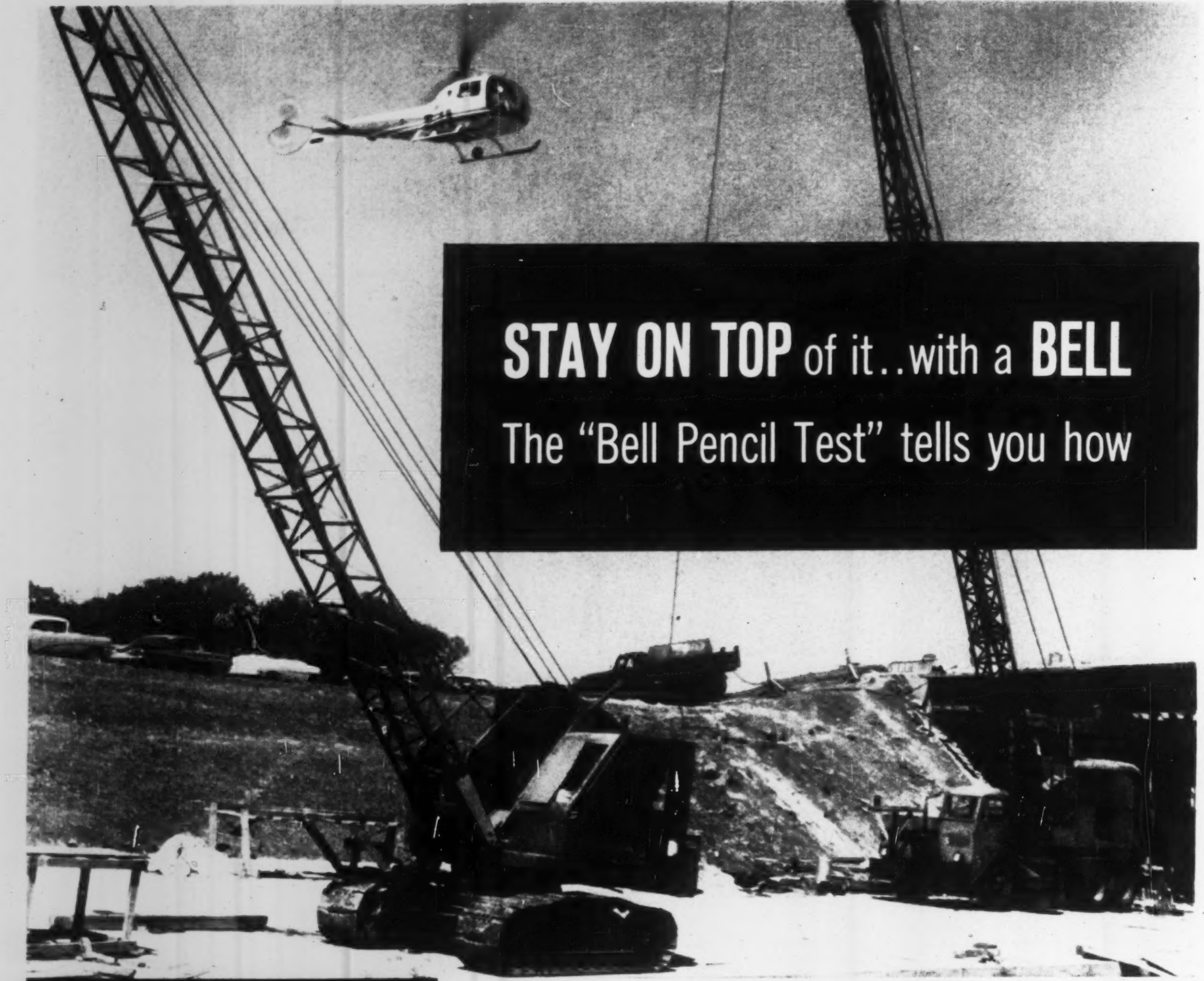

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Industry Seeks Better Teamwork

- **St. Louis labor and management form first local joint conference. One goal: Preserve the contract system**
- **Other hoped-for dividends: More productivity, lower costs, higher efficiency, fewer work stoppages**

Labor and management took another historic step last week in their current efforts to promote the welfare of the construction industry.

The step was taken in St. Louis, where the Construction Industry Joint Conference launched its first local affiliate.

The national conference was formed in April by national contractor associations and the international building trades unions (ENR Apr. 16, p. 27). Its aims include promotion of the contract system, improved performance and productivity by contractors and construction workers and the elimination of work stoppages.

Vincent F. Morreale, general counsel to the laborers international union, formally presented the authorization for the pilot St. Louis Joint Conference at a dinner meeting in the Hotel Chase sponsored by the city's Building Trades Council and Associated General Contractors. Mr. Morreale is secretary of the labor members of the national conference's Joint Administrative Committee.

Some 700 persons, including representatives of international building trades unions and national contracting organizations, attended the dinner. They were warned that better teamwork in the construction industry is essential and were assured that the new organizations will not duplicate or infringe on existing ones.

Principal speakers, in addition to Mr. Morreale, were Richard J. Gray, president of the AFL-CIO Building and Construction Trades Department; Frank J. Rooney, Miami contractor who heads the national AGC labor committee; and James D. Marshall, executive director of the national AGC in Washington.

• Slow aborning—Mr. Gray recalled that he had suggested in 1954 the formation of a permanent committee that would enable labor and management to exchange views on common problems. At that time, he pointed out a number of areas where the construction industry could be better served by a common front.

"Such cooperation is a two-way street," Mr. Gray told the St. Louis group. He alluded to labor's difficulties on the $47-million Bull Shoals Dam job shortly after the Taft-Hartley Act became effective, the long delays in getting National Labor Relations Board cases settled and instances in which labor complaints remain unsettled long after the construction jobs out of which they arise are completed. Nevertheless, he said:

"Such a gathering as this is something I have thought about for many years. . . . If we develop along these lines and get real cooperation, I think we can see real success ahead in the venture."

Mr. Rooney said that both labor and management have come to realize that something has to be done about loss of work performed in the past by competitive bidding under the contract system. He suggested that better public relations are needed and called for self analysis and correction of deficiencies.

• More efficiency—Some indication of what the St. Louis group hopes to accomplish came from the sponsors in the form of this statement that appeared on the printed program:

"Tonight, July 9, 1959, labor and management organizations of the St. Louis construction industry have been accorded the privilege of being first in the nation authorized by the National Construction Industry Joint Conference to develop a local conference, affiliated with the national group, working toward maintaining and expanding the construction market for construction people, through development of an ever more efficient product."

These specific objectives appeared on large banners behind the speakers' table:

"To foster unity and teamwork in the industry."

"To develop through teamwork ever greater efficiency."

"To sell the idea—'construction work by construction people—new work or maintenance.'"

"To promote more construction work in St. Louis."

"To secure this work for construction people."

• Industrial union competition—Mr. Marshall said he visualized 100 or more U. S. cities with organizations similar to the pilot conference in St. Louis.

In stressing the need for such an approach to industry problems, he pointed to the inroads made by industrial unions on work formerly done by the building trades, the loss of maintenance work to in-plant maintenance crews and the construction industry's slippage in such new areas as nuclear plants, where installation is done by factory technicians (see page 300).

He indicated that the conference program is not a panacea but called it a start toward solution of problems affecting management and labor alike.

Mr. Morreale, speaking in the same vein, drew this analogy, after stressing that the conference would not infringe on the autonomy of the existing organizations:

Let the joint conference emulate a good doctor and examine the patient, seek out the disease and prescribe a cure. It will still be up to the patient, namely the industry, to decide whether to get the prescription filled and to take the medicine.

Workers Idled by Strike Keep Jobless Benefits

The extent to which state unemployment compensation benefits can be used to finance strikes is a question for the states and not the federal government to decide, the U. S. Supreme Court has decided.

By refusing to review a Michigan Supreme Court decision last week, the court subscribed to this proposition:

Workers laid off at one plant because of a strike by the workers' union at another plant of the same company are eligible for compensation because they are not directly involved in the strike and the idleness is not of their own making—if the appropriate state court says so.

The court based its refusal to intervene on the absence of any substantial federal question.

The Michigan case arose when members of the auto workers union struck a Ford plant in Canton, Ohio, and UAW Ford workers in Detroit were later laid off as a result of the strike. Some 11,000 Detroit workers sought and received Michigan unemployment compensation benefits.

(*Labor continued p. 300*)

Technicians: A New Concern

Federal policies on technical training are viewed as a threat to apprentice training and building tradesmen

Federal efforts to promote the training of technicians have alarmed construction men enough to give the issue high priority on the agenda of the new Construction Industry Joint Conference.

Here's what has happened: Last year Congress authorized the use of federal funds for the training of technicians or skilled workers in scientific or technical fields essential to national defense. This was done through the National Defense Education Act of 1958.

The U.S. Office of Education, in administering the law, has denied use of the funds for training apprentices or journeymen in the construction industry and is allowing the funds to be used for the training of technicians.

The result is that a federally sponsored two-year program of technical training is being conducted in competition with some of the construction industry's longer apprenticeship programs. And some of the technicians produced under the program may be after the same jobs now held by building tradesmen.

Peter T. Schoemann, general president of the plumbers union, has called the problem "one of the most important things of joint concern that has occurred in recent years." He "spread the entire story" before the delegates to the 77th annual convention of the National Association of Plumbing Contractors in Miami Beach earlier this month.

"How long," Mr. Schoemann asked, "do you suppose an apprentice is going to keep up the high standards our programs have set for him when he sees these 'technicians' getting jobs as journeymen with a good deal less than half the training? Not very long, I can assure you. And that is why I say this technician training not only duplicates an important part of our own training programs but also threatens their very destruction."

Mr. Schoemann said the construction industry must do three things:

- Secure National Defense Education Act funds for related instruction for journeymen and apprentices.
- Make sure the funds are available for vocational training in the construction industry.
- Convince the Office of Education, through a long-range educational campaign, that technicians have no place in the plant or on the construction job except in specialized jobs such as drafting or laboratory work.

The Senate Appropriations Committee has already been approached on the first two points by members of the construction industry. And the recently formed Construction Industry Joint Conference is reportedly working on the third problem through a special subcommittee.

Mr. Schoemann has two strings to his bow. He claims that the 1958 law was intended to cover journeymen and apprentices in the construction industry and that it has been subverted by a "studied effort." And he contends that it is building tradesmen who are "primarily engaged" in technical work vital to national defense, such as atomic installations and intercontinental missile launching sites.

Industry Employment Still Down

Construction employment failed to keep pace last month with the over-all employment improvement in the nation's nonfarm economy.

The federal government reports that the nonfarm job situation improved "substantially" in May, raising the nonfarm job total to 52 million and cutting unemployment down to 3.4 million. It describes this employment increase as "the largest for any May since World War II."

Included in the employment figure is a 184,000 increase in construction employment, putting total contract construction employment in May at 2,840,000.

The May increase in construction is lower than the corresponding increase for last year and lower than the one for 1956, although it is more than twice as large as the May 1957 increase.

The total construction employment figure—2,840,000—is lower than five of last year's monthly averages, lower than eight of the 1957 monthly averages and lower than nine of the 1956 monthly averages. (The highest May average for this period—was 3,082,000, achieved in 1957.) The 1959 figure, however, does represent the largest January-May increase in the last four years.

On the broader front, the durable goods industries accounted for most of the manufacturing employment increase, with steel and other primary metals, fabricated metals and machinery industries reporting better than seasonal gains.

The factory workweek moved up to 40.5 hours—the longest for any May since 1955—and factory workers' weekly earnings reached a new high of $90.

The total unemployment figure, however, was 700,000 higher than in May two years ago.

Wage Pact Penalizes Tardiness

Some 5,000 sheetmetal workers in the Chicago, Cook and Lake County (Ill.) areas will be docked for failure to put in a full day's work when they arrive late or leave their jobs early.

Reflecting industry efforts to promote labor's "Ten Commandments," this was one of the provisions incorporated in a new labor agreement between Local 73 of the sheetmetal workers union and 400 ventilating, air conditioning and sheetmetal contractors in the area.

The contract also provides that apprentices, sent to school one day a week at contractor expense, will be discharged and lose union accreditation if they miss more than five classes a year without proper excuses.

The new one-year contract grants a wage increase of 20 cents an hour and puts journeymen's pay, including fringe benefits, at $4.15½ an hour. Fringes include 15 cents an hour for pensions and 7½ cents an hour for health and welfare.

Meanwhile, three more building trades unions in Chicago have completed their wage negotiations with new one-year contracts along these lines:

- **Some 4,000 bricklayers won a 25-cent-an-hour increase** from the Building Construction Employers Association, giving union members a new scale of $4.07½, plus 7½ cents for welfare.
- **The 45-member Employing Plasterers Association has given 1,700 plasterers a 25-cent pay increase.** New scale is $3.95 an hour, plus another 23 cents for pensions, health and welfare and industry promotion.
- **Ornamental ironworkers have been granted a 12-cent increase** by the Iron League of Chicago, pushing the hourly scale of the 1,000-member local to $4.05, plus 19½ cents for pensions, health and welfare and apprenticeship.

Elsewhere, three major strikes were

settled, although a strike-lockout initiated by the operating engineers continued to plague the construction industry in Arizona.

Operating engineers, who had tied up the Western Washington construction industry for three weeks, returned to work under a two-year contract that grants a 30-cent increase now and another 25 cents next year. A hiring hall dispute was resolved by an exclusive hiring hall clause.

In Ohio, work resumed after a two-week strike on $372 million worth of road projects following agreement on a new contract between operating engineers Local 18 and 100 contractors in 76 Ohio counties. The two-year pact grants a 10-cent pay hike each year and a new 10-cent welfare contribution. The new contract sets up an exclusive hiring hall.

And some 5,000 laborers employed by members of the Illinois Road Builders Association returned to work on $100 million worth of projects under a two-year contract that grants a 25-cent increase now.

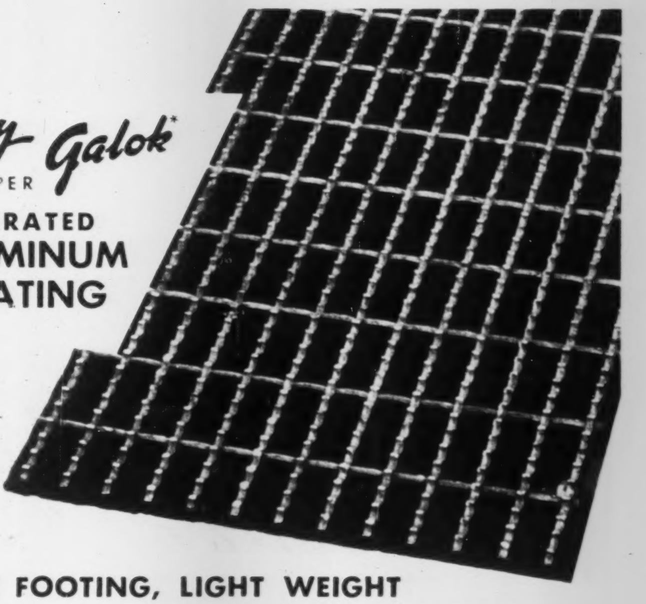
Labor in Brief . . .

- **Wage bill passed**—A bill requiring contractors on public works jobs to pay prevailing wages, as determined by the State Labor Commissioner, has been passed by the Oklahoma Senate and sent to the House. Maximum penalty for noncompliance is a $500 fine and six months in jail.

- **Sliding scale benefits**—An unemployment compensation amendment signed by Wisconsin's Gov. Gaylord Nelson (D.) puts the state's maximum weekly benefits on a sliding scale. Effective January 1, maximum benefits will be 52½% of the statewide average weekly wage, adjusted semiannually. This is expected to yield an initial maximum of $43 a week.

- **Better apprentices**—The Fifteenth Annual Eastern Seabord Apprenticeship Conference is being held in Providence, R. I., this week. Separate section meetings are scheduled for the building trades. Purpose is to seek ways and means to improve the quality and quantity of apprenticeship.

- **Aluminum talks near**—Members of the steelworkers and aluminum workers unions will soon start bargaining with major aluminum producers whose labor contracts expire July 31. Current labor negotiations in the steel industry are expected to set both the demand and the settlement patterns.



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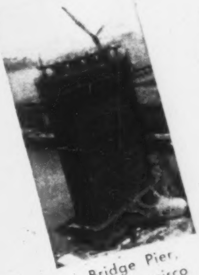
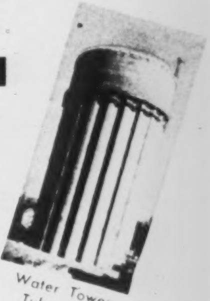
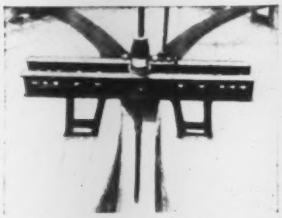


Bridge Pier, San Francisco



Water Tower, Tyler, Texas



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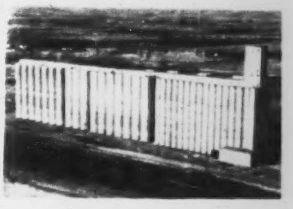

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CIRCLE 1-A READER SERVICE CARD

Bids: June 25, 1959.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A. M., advanced standard time, which is nine-thirty o'clock A. M., eastern standard time, on the 25th day of June 1959, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, G. L. NICKERSON, District Engineer, 353 Broadway, Albany 1, New York						
Albany (Rte. 9 & 155)	R.C. 59-91	London Road, S.H. 22 Shakers Watervliet, S.H. 879	4.65	Asphalt Concrete Pavement	$8,500 Plans $5	$159,000
Greene (Rte. 9W & 23 & 23A)	R.C. 59-90	Palenville Catskill, S.H. 8231 Saugerties Catskill, Pt.3, S.H. 5027 Catskill Village, S.H. 5366 Catskill West Coxsackie, Pts. 1A & 1B, S.H. 1934 and S.H. 8414 Rip Van Winkle Bridge, S. H. 8414, S.H. 8482 and Catskill Village Main, Bridge and Spring Streets, S.H. 5685	2.53	Asphalt Concrete Pavement	$6,500 Plans $5	115,000
Schenectady (Rte. 50)	R.C. 59-84	Schenectady Thomas Corners, S.H. 1172	1.46	Asphalt Concrete Pavemen	$3,000 Plans $5	53,000
Washington (Rtes. 4, 22, 22A & 149)	R.C. 59-79	Smiths Basin Hartford, S.H. 802 Sandy Hill Fort Ann, S.H. 803 Comstock Fort Ann, S.H. 1224 Smiths Basin Baldwin Corners, S.H. 1835 Middle Granville Hampton Fair Haven, S.H. 1637 Middle Granville North Granville, S.H. 5648 and Comstock North Granville, S.H. 9016	....	Roadside Development	$800 Plans $5	15,000
DISTRICT No. 2, LACY KETCHUM, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Herkimer (Rte. 28)	FASH 59-12	Herkimer Village West Canada Boulevard Project U-551(3)	0.90	Asphalt Concrete Type 1A Pavement = 0.89 Miles Misc. Work = 0.01 Miles	$15,000 Plans $5	271,000
DISTRICT No. 3, F. B. TOWLSON, Acting District Engineer, 333 E Washington Street, Syracuse, New York						
Cayuga (Rte. 90)	FARC 59-72	Montezuma Cayuga Union Springs, Pt. 2, S.H. 8519 Project F 598(5)	4.18	Asphalt Concrete Type 1A Pavement	$7,000 Plans $5	139,000
Onondaga (Rte. 11)	R.C. 59-70	Syracuse Cicero, S.H. 5470	3.30	Asphalt Concrete Type 1A Pavement	$8,500 Plans $5	153,000
Onondaga (Rte. 41A)	FARC 59-71	Skaneateles West Lake, Pts. 3, 4 and 5, S.H. 486 West Lake, Pt. 2, S.H. 292 West Lake, S.H. 48 Skaneateles Connections, S.H. 9079, Proj. S-563(1)	4.74	Asphalt Concrete Type 1A Pavement	$7,500 Plans $5	137,000
Oswego (Rte. 48)	R.C. 59-77	Fulton Baldwinsville, Pts. 1 and 2, S.H. 8372	3.58	Asphalt Concrete Type 1A Pavement	$6,000 Plans $5	116,000
Tompkins (Rte. 79)	R.C. 59-81	Enfield Center Ithaca, S.H. 1001	6.42	Asphalt Concrete Type 1A Pavement	$10,000 Plans $5	182,000
Tompkins & Wayne (Rtes. 34B, 366, 14 & 31)	R.C. 59-76	Br. No. 1, Meyers King Ferry, Pts. 1 and 2, S.H. 5720 Br. No. 2 and Br. No. 3, Etna Freeville Dryden, S.H. 5294 and Br. No. 1, 100, Lyons Village Geneva Street, S.H. 9271		Clean. & Paint. 4 Bridges	$800 Plans $5	15,000
Wayne (Rte. 89)	FARC 59-62	Clyde Resort, Pt. 3, S.H. 1059 Project S-281(1)	1.88	Asphalt Concrete Type 1A Pavement	$11,000 Plans $5	206,000
Wayne (Rte. 14)	R.C. 59-78	Lyons Sodus Point, Pt. 4 S.H. 1786	5.00	Asphalt Concrete Type 1A Pavement	$8,500 Plans $5	150,000
DISTRICT No. 4, B. F. PERRY, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Livingston (Rte. 63)	FARC 59-60	Mount Morris Geneseo, S.H. 622 Project F 557(9)	3.32	Asphalt Concrete Type 1A Pavement	$14,000 Plans $5	250,000
Monroe (Rte. 104)	FATS 59-7	Winton Road Sea Breeze, Pt. 1, FASH 52-1 Winton Road Sea Breeze, Pt. 2, FASH 56-7 Project U 1097(4)	2.77	Traffic Signs & Delineators	$2,000 Plans $5	37,000
Monroe (Rte. 15)	FARC 59-63	West Henrietta Rochester, S.H. 62 Project F 554(4)	4.77	Asphalt Concrete Type 1A Pavement	$25,000 Plans $5	433,000
Monroe (Rte. 18)	FARC 59-74	Kendall Mills Hamlin Center, S.H. 8362 Project F 508(7)	3.94	Asph. Conc. Type 1A Pavt. = 3.92 Miles Misc. Work = 0.02 Miles	$9,000 Plans $5	162,000
DISTRICT No. 5, F. G. H. YOUNGMANN, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Chautauqua & Erie (Rtes. 20 & 240)	R.C. 59-75	Br. No. 1, Orchard Park, Pt. 4, S.H. 68 Br. No. 1, Westfield Viaduct and Approaches, S.H. 9096		Clean. and Paint. 2 Bridges	$2,000 Plans $5	35,000
Erie (Rte. 18B)	FGRC 59-52	Gardenville Williamsville, Pt. 1, S.H. 1733 Project UG 1080(1)	0.61	9" Cem. Conc. Pavt. 2 @ 25' Wide R.R. Sep. Plate Girder 3 Sp. 239.3'	$60,000 Plans $5	1,131,000
DISTRICT No. 6, J. H. THOMAS, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Chemung & Tioga & Steuben (Rtes. 14, 17 & 17C)	R.C. 59-64	Painted Post Addison, Pt. 3, (PSC 5334) S.H. 5349A Corning Painted Post (PSC 5355), S.H. 5026 Elmira North Elmira (PSC 4700), S.H. 1378 Waverly Owego, Pt. 3 (PSC 4760), S.H. 5257 and Owego Campville, Pt. 3 (PSC 5992) S.H. 1870		Clean. & Paint. 5 Bridges	$1,000 Plans $5	17,000
Steuben	FASS 59-16	Allen Road, Co. Rd. 22 Project S 257(1)	0.32	Asph. Conc. Pavt. Comp. I-Beam Br. 3 Span 211.5'	$20,000 Plans $5	349,000
Steuben	FASS 59-15	Caton-Hendy Creek, C.R. 120 Project S 259(3)	3.56	Asphalt Concrete Pavement	$6,500 Plans $5	120,000
Tioga	FASS 59-18	Tioga Center Halsey Valley, C.R. 901 Project S 540(1)	0.46	Asph. Conc. Pavt., I-Beam Bridge, 1 Sp. 32' Comp. W F Beam Bridge, 1 Span 87.5'	$10,000 Plans $5	183,000
DISTRICT No. 7, R. W. SWEET, District Engineer, 444 Van Duzee Street, Watertown, New York						
Saint Lawrence (Rte. 37)	FARC 59-65	Massena Waddington, Pt. 5, S.H. 1658 Massena Waddington, Pts. 1, 2, 3 and 4, S.H. 521 Project F-580(14)	8.04	Asph. Conc. Pavt. = 8.02 Mi. Misc. Work = 0.02 Mi.	$92,000 Plans $5	1,682,000
DISTRICT No. 8, K. G. RAVER, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Westchester (Int. Tour. Rte. 187)	FICWE 59-1	Interstate Route Conn. 520 (Cross Westchester Expressway Bloomingdale Road Connection) Project I 1101(8)	0.66 (0.97 Acc.)	9" Cem. Conc. Pavt. Var. Wide = 1.06 Mi. 9" Cem. Conc. with Carb. Black Var. Wide = 0.05 Mi. Asph. Conc. Pavt. = 0.42 Mi. Misc. Work = 0.10 Mi. 3 Hy. Seps. Comp. I-Beams 4 Sp. 203.4', 4 Span 238' and 5 Span 300.7'	$80,000 Plans $5	1,463,000
Westchester	FASS 59-17	Quaker Ridge Road, Co. Rd. 139 Project S 480(1)	1.47 (0.88 Acc.)	9" Cem. Conc. Pavt. 48' Wide = 2.05 Mi. Asph. Conc. Type 1A Pavt. = 0.30 Mi. Hy. Sep. Reinf. Conc. Rigid Frame, 90.1' Span	$75,000 Plans $5	1,356,000
DISTRICT No. 9, J. C. FEDERICK, District Engineer, 71 Frederick Street, Binghamton, New York						
Broome, Delaware Otsego, Schoharie, & Sullivan	R.C. 59-67	Br. No. 1, S.H. 5412 Br. No. 1, S.H. 1486 Br. No. 1, S.H. 1608 Br. No. 1, S.H. 1241 Br. No. 1, S.H. 1440 Br. No. 1, S.H. 5383 Br. No. 1, S.H. 5045 Br. No. 1, S.H. 5671 Br. No. 2, S.H. 5443 Br. No. 1, S.H. 1271 Br. No. 1, S.H. 8254 Br. No. 6, S.H. 5577 Br. No. 1, S.H. 1454 Br. No. 1, S.H. 1215 Br. No. 3, S.H. 5234 Br. No. 1, S.H. 1463	....	Clean. & Paint. 16 Bridge	$5,500 Plans $5	99,000
DISTRICT No. 10, M. E. GOLL, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Nassau	FALIE 59-1	Long Island Expressway (Jericho Turnpike to South Oyster Bay Road) Project I UG 862(18)	3.33 (5.86 Acc.)	9" Cem. Conc. Pavt. with Carb. Black 2 @ 37' Wide = 2.50 Mi. 9" Cem. Conc. Pavt. Var. Wide = 2.62 Mi. Asph. Conc. Pavt. = 3.24 Mi. Misc. Work = 0.83 Mi. 4 Sp. Ped. Overpass, I-Beam 175' 1 RR Sep. Comp. I-Beam, 1 Sp. 64.[illegible]'; 4 Hy. Seps. Conc. Rig. Frame 2 Sp. 142.2'; 1 Sp. 84.8'; 1 Sp. 64' and 2 Sp. 142.3'; 1 Hy. Sep. Comp. I-Beam 1 Sp. 65.8'	$440,000 Plans $10	7,803,000

(Continued on the following page)

(Continued from preceding page)

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: June 25, 1959.

Contract B.P. 59-75

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Public Building Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., June 25, 1959, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract B.P. 59-75 for
Beach Protection
(Artificial Beach Nourishment and Two Stone Groins)
at East Hampton, Town of East Hampton
Suffolk County, New York

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor The Gov. Alfred E. Smith State Office Bldg., Albany, New York
(b) Department of Public Works, 270 Broadway, New York City, New York.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract B.P. 59-75 may be examined and obtained at the office of Mr. Milton E. Goul, 325 West Main St., Babylon, L. I., New York.

The deposit for Plans and Proposal Forms for Contract B.P. 59-75 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's Estimate of Cost for Contract B.P. 59-75 is $575,100.00.

Proposals for Contract B.P. 59-75 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the State of New York, Commissioner of Taxation and Finance for the sum of $30,000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Public Building Law and to the Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: June 25, 1959

Contract Spec. No. FA-SM-140

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m. Advanced Standard Time on June 25, 1959, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON INTERSTATE ROUTE 503-2-1, NEWBRGH BEACON BRIDGE TO CAREY ROAD, PROJECT I-113(2), ITEM 90B, DUTCHESS COUNTY, WHICH CONSTITUTES CONTRACT SPEC. NO. FA-SM-140.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, N. Y.
(b) Mr. K. G. Rauer, District Engineer, New York State Department of Public Works, Pleasant Valley Road, Poughkeepsie, N. Y.
(c) Mr. William Mende, Principal Building Construction Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5,000. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50 percent of deposit.

The Engineer's Estimate of cost for this work is $24,000.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1,500.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF PUBLIC WORKS

Bids: August 22, 1959.

Republic of Iraq, Development Board & Ministry of Development, Kadhemain Hospital.

Contract No. 1/1959

The Development Board and Ministry of Development invite tenders from experienced Building Contractors for the erection and completion of a general Hospital containing 326 beds, a service building consisting of Boiler House, Laundry, Incinerator, Workshops, Garage and Guard House, Quarters for Nurses, and Resident Medical Officers Residences and Apartments for Doctors, site works and all Incedental and auxiliary work which is required for Kadhemain Hospital, Iraq.

Full information regarding this tender may be inspected from the Ministry of Development, Baghdad Iraq and from the nearest Iraqi Diplomatic Representative and from the offices of Stephenson & Turner Architects at 1374 Little Collins Street, Melbourne, Australia.

Tender must be submitted in English to the Ministry of Development, D.G. of Legal Affairs & Contracts, Baghdad, Iraq, on or before 12 noon 22nd August 1959.

Minister of Development

Bids: July 9, 1959

Construction of Water Transmission Main

Notice is hereby given that sealed bids will be received in accordance with the law by the Erie County Water Authority until ten o'clock A.M.—Eastern Daylight Saving Time on the ninth day of July, 1959 at the office of the Authority, 338 Ellicott Square Building, Buffalo 3, New York, for furnishing materials and performing the labor for constructing a forty-two (42") inch diameter water transmission main in the Town of Evans, Erie County, New York, all in accordance with plans and specifications prepared by Buck, Seifert and Jost, Consulting

Engineers, 112 East 19th Street, New York 3, New York.

Copies of the plans and specifications may be obtained either from the Erie County Water Authority or from the Consulting Engineers upon deposit of Twenty-Five ($25.00) Dollars, which sum will be refunded upon return of the plans and specifications in good condition within ten (10) days after the date on which bids are received or else the entire deposit will be forfeited.

The work to be done includes all materials and labor, tools, plant and equipment necessary for constructing, installing, testing and completing, ready for operation, approximately twenty-five thousand two hundred (25,200') feet of forty-two (42") inch diameter water transmission main with connections to existing mains, valves, air relief and blow-off facilities, manholes and other accessories and appurtenances.

Each proposal must be accompanied by a certified check payable to the Erie County Water Authority or a bid bond to the favor of the Authority from a reliable surety company authorized to do business in the State of New York and satisfactory to the Authority, in amount equal to ten (10%) percent of the proposal. The certified checks will be retained to pay for any damage or loss to the Authority, or the liability bonds will accrue, in case the successful bidder shall neglect or refuse to enter into a contract in accordance with his proposal.

The Authority reserves the right to consider bids for twenty (20) days after their receipt before awarding any contract and the right is reserved to accept any bid or to reject any or all of them.

ERIE COUNTY WATER AUTHORITY
By: WILLIAM J. CARNEY
Secretary

Buck, Seifert and Jost
Consulting Engineers
Dated: June 11, 1959

Bids: July 14, 1959.

Construction of Railroad Embankment and Miscellaneous Structures

Sealed proposals will be received at the office of Wm. J. Hedley, Chief Engineer, Wabash Railroad Company, Railway Exchange Building, St. Louis 1, Missouri, until 12 noon (C.S.T.) on the 14th day of July, 1959, for constructing approach fills and miscellaneous structures adjacent to a double track railroad bridge now being constructed over the Calumet Sag Channel near Palos Park, Illinois. Plans, specifications, and other information concerning this project can be obtained from the office of the Chief Engineer, Wabash Railroad Company, Railway Exchange Building, St. Louis 1, Missouri, upon payment of $10 per set.

Bids: July 9, 1959

New Jersey Turnpike Authority

CONTRACT NO. R-33 (R-33A, R-33B)

Proposals are invited for Contracts Nos. R-33, R-33A and R-33B which involve the construction of timber and pre-cast concrete Salt Storage Buildings at Maintenance Areas 3 and 4, (R-33A) at Crosswicks and Milltown, respectively, and at Maintenance Areas 5 and 6, (R-33B) at Elizabeth and Secaucus, respectively, along the New Jersey Turnpike in Burlington, Middlesex, Union and Hudson Counties, New Jersey. Contract R-33 comprises all the work required under Contracts R-33A and R-33B.

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 o'clock, Eastern Daylight Saving Time, on the morning of July 9, 1959, at which time and place said proposals will be publicly opened and read.

Each bidder must submit a Contractor's Financial and Equipment Statement with his Proposal.

Contract documents may be examined during office hours on or after June 19, 1959, at the office of the Authority and will be furnished upon payment of Five dollars ($5.00) for each set. Contract documents are not required to be returned and the payment will not be refunded.

NEW JERSEY TURNPIKE AUTHORITY
Joseph Morecraft, Jr., Chairman

June 11, 1959 A-1
R-33 (R-33A, R-33B)

Bids July 9, 1959

Boice Drain
Drainage District No. 2494

NOTICE OF LETTING OF
DRAIN CONTRACT AND
REVIEW OF APPORTIONMENTS

NOTICE IS HEREBY GIVEN, That I, HENRY V. HERRICK, County Drain Commissioner for the County of Wayne, State of Michigan, will now and until 11:00 A.M. E.S.T. on THURSDAY the 9th day of July A.D., 1959, receive sealed bids for the Cleaning Out, Relocating, Widening, Deepening, Straightening and Tiling of a certain drain known and designated as BOICE DRAIN, Drainage District No. 2494, located and established in the Townships of Romulus and Nankin and the Village of Wayne, Wayne County, Michigan, in the office of the Wayne County Drain Commissioner, 3523 Cadillac Tower, Detroit 26, Michigan, at which time bids will be publicly opened and read by Mr. Henry V. Herrick, the Wayne County Drain Commissioner.

Said Drain consists of approximately 11,000 lineal feet of 12" to 108" diameter sewers in open cut and tunnel, together with junction chambers, manholes and appurtenances according to drawings and specifications prepared by Brender and Brender, Engineers of Wayne, Michigan.

In the construction of said drain, the following quantities and character of tile or pipe will be required:

1508 L.F. of 108 inch R.C. pipe Sewer ASTM C-76-2
4878 L.F. of 102 inch R.C. Pipe Sewer ASTM C-76-2
3238 L.F. of 84 inch R.C. Pipe Sewer ASTM C-76-1
1400 L.F. of 60 inch R.C. Pipe Sewer ASTM C-76-1
380 L.F. of 36 inch R.C. Pipe Sewer ASTM C-76-1
255 L.F. of 24 inch Concrete Pipe
30 L.F. of 42 inch R.C.P. Sewer ASTM C-76-2
35 L.F. of 12 inch Clay Pipe ASTMA C-200
3 each M.H. on 108" & 102" Pipe
6 each M.H. on 84" & 60" Pipe
7 each M.H. on 36" and under
2 each Transition Chamber
3 each Standard Catch Basins
1 each Headwall at River
1 each Inverted Syphon and Chambers
6 each Special Inlets

Said job will be let in accordance with plans now on file with the other papers pertaining to said Drain in the office of the County Drain Commissioner for the County of Wayne, to which reference may be had by all parties interested, and bids will be made and received accordingly. Contract will be made with the lowest responsible bidder, for the entire job, who shall give adequate security for the performance of the work. I hereby reserve the right to reject any or all bids, waive any irregularities in bidding, and/or to adjourn such letting to such time and place as I shall publicly announce.

The Drain Commissioner shall have the right to hold all bids for a period of One Hundred and Fifty (150) days after the opening thereof. No bidder shall have the right to withdraw his bid during such time.

The Drain Commissioner shall, within the period of 150 days, herein provided for the holding of bids, obtain the approval of the Wayne County Board of Auditors to the awarding of the contract to the lowest responsible bidder, and shall notify such bidder of his award of the contract. The Drain Commissioner shall be given 150 days from the date of receipt of bids to sell bonds in an amount sufficient to pay for this project, it being understood that if the Drain Commissioner shall not have marketed bonds in an amount sufficient to pay for this project within such 150 day period no contract shall be executed. If within such 150 day period the Drain Commissioner shall successfully sell bonds in an amount to pay for the project, the Drain Commissioner shall forthwith notify the successful bidder of such sale and a contract with the successful bidder, shall be executed within ten (10) days from the date of notice of the sale of bonds. The bid, of the successful bidder, and the bond securing the same, shall remain in full force and effect until the contract is executed. If the bonds hereinbefore required to be sold are not marketed within the period provided above, the bid shall be deemed to be null and void and the bid deposit shall be returned to the successful bidder.

The 150 day period provided above for the sale of bonds and the giving of notice thereof may be extended from time to time by mutual agreement between the successful bidder and the Drain Commissioner.

The successful bidder shall not be required to execute performance bond, material lien bond, or provide the insurance herein otherwise required until he shall first have been notified of the sale of the bonds by the Drain Commissioner, and upon receipt of such notice, the successful bidder shall be required to execute and deposit such bonds and insurance as are required by the terms of the contract at the time of the execution thereof.

Copies of the plans and specifications may be secured from the office of the Drain Commissioner of the County of Wayne, Michigan at 3523 Cadillac Tower, Detroit 26, Michigan. A deposit of Twenty-five Dollars ($25.00), CHECK ONLY, will be required on each set of plans, which will be refunded upon their return in good order within thirty (30) calendar days after the opening of bids.

Any person desiring to bid on the above mentioned work will be required to deposit with the County Drain Commissioner a certified check or bank draft payable to the Wayne County Drain Commissioner, or a satisfactory bid bond executed by the bidder and a surety company in an amount equal to five percent (5%) of the bid, shall be submitted with each bid.

The payments for the above mentioned work will be made as follows: IN CASH, FROM THE RECEIPTS OF THE SALE OF BONDS. Contractor may draw up to 80% of work completed from time to time and upon the approval of the Engineer. Taxes will be spread in Thirty (30) installments. First installment, December, 1959. Dated this 10th day of June A.D., 1959.

HENRY V. HERRICK
County Drain Commissioner for the County of Wayne

Bids: July 9, 1959

New Jersey Turnpike Authority

CONTRACT NO. R-35

Proposals are invited for Contract No. R-35 which involves the fabrication and erection of one aluminum overhead sign bridge, complete with illuminated sign panels, over Route U. S. 46 near Overpeck Creek; the fabrication and erection of one illuminated sign panel on an existing sign bridge over Route U. S. 46 near West Columbia Avenue; revisions to the illumination of two sign panels on an existing sign bridge over the exit ramps at Interchange 18 of the New Jersey Turnpike; and revisions to the illumination of two sign panels on an existing sign bridge over the exit ramps at Interchange 11 of the New Jersey Turnpike, in Bergen and Middlesex Counties, New Jersey.

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey until 11:00 o'clock, Eastern Daylight Savings Time, on the morning of July 9, 1959, at which time and place such proposals will be publicly opened and read.

Contract documents may be examined during office hours on or after June 16, 1959, at the office of the Authority and will be furnished upon payment of Ten Dollars ($10.00) for each set.

NEW JERSEY TURNPIKE AUTHORITY
Joseph Morecraft, Jr., Chairman
June 10, 1959 A-1
R-35

Bids July 7, 1959

Contract NYA-410.001

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
CENTRAL HEATING AND
REFRIGERATION PLANT
ALTERATIONS

Sealed proposals for alterations to the Central Heating and Refrigeration Plant at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, July 7, 1959, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Assistant Chief Engineer for Design of the Authority, Room 1115. Documents will be furnished upon deposit of $20.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman
New York, June 18, 1959

Bids June 30, 1959

Contract O&M-532

THE PORT OF NEW YORK AUTHORITY
PORT NEWARK
RESURFACING OF FLOOR PAVEMENT
BUILDING 139

Sealed proposals for furnishing all labor, material and equipment for resurfacing portions of the floor pavement of Building 139 at Port Newark, New Jersey, will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 AM Tuesday, June 30, 1959, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services Room 960, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, and you will be furnished with the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman
New York, June 18, 1959

Bids: June 29, 1959

Construction of Trunk and Lateral Sewers in the Town of Greece, Monroe County, New York

NOTICE IS HEREBY GIVEN that pursuant to resolution of the Town Board of the Town of Greece, Monroe County, New York, sealed proposals will be received on the 29th day of June, 1959, at 3:00 o'clock P.M. at the Town Hall, 2505 Ridge Road West, Rochester 15, New York, for the furnishing of all materials, tools, equipment and labor for the construction of sanitary trunk sewers and appurtenances in Sanitary Sewer District No. 1, Extension No. 27 in accordance with the contract documents therefore, prepared by Nussbaumer, Clarke & Velzy, Consulting Engineers, and all of which are on file with the Town Clerk, 2505 Ridge Road West, Rochester 15, New York, also at the office of Nussbaumer, Clarke & Velzy, 327 Franklin Street, Buffalo 2, New York. One (1) copy of said proposed documents may be obtained upon payment to the order of Gordon A. Howe, Supervisor, of a certified check for $35.00.

Each bid must be accompanied by security in an amount not less than five percentum (5%) of the amount of the bid in the form and subject to the conditions provided in the Information for Bidders contained in the Contract Documents.

The right is reserved to waive any informalities in the bids and to reject any or all bids.

N. RAYMOND KRAFT, Town Clerk

U. S. Government

BRIDGE CONSTRUCTION: U. S. Army Engineer District, Memphis, Corps of Engineers, P.O. Box 97, Memphis 1, Tenn. Sealed bids will be received at this office until 1:30 P.M., C.S.T., 25 June 1959, and then publicly opened, for constructing two county bridges, Round Pond Interior Drainage, St. Francis River, Arkansas. $15.00 deposit required on plans. Information on request.

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P-1906, Engineering News-Record
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Civil Engineer with broad highway background. Should know control of soil work, design and control of concrete and asphaltic mixes, and actual field construction. Personality to function as staff consultant needed. Minimum age—38 years. Salary $10,000 to $12,500. Only complete application will be reviewed. Reply P-1851, Engineering News-Record.

Resident Engineer Wanted. Graduate engineer with experience in supervision of construction on water, sewerage, steam power and/or building construction. Location generally midwest, but assignments may be to other areas of U. S. Established midwest consulting engineering firm. Reply in detail to P-1293, Engineering News-Record.

Experienced Architects and Architectural Draftsmen. Excellent opportunity with established consulting firm in Middle West. State education, experience and required salary. Reply to P-1545, Engineering News-Record.

Wanted—Graduate Civil Engineer—3 to 5 years field experience layout roads and bridges—interested in permanent position—can progress to Ass't Sup't. or Sup't. of Construction—Principal working area New York and Pennsylvania. Submit full resume, experience, salary, education. P-1794, Engineering News-Record.

(Continued on following page)

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P-1832, Engineering News-Record
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(Continued from preceding page)

Associate and Assistant Professors for fields of advanced dynamics, advanced strength, and elasticity. Also have opening for graduate student as half-time instructor. Engineering Mechanics Dept., Kansas University, Lawrence, Kansas.

Construction Superintendent experienced in all phases of large & heavy building projects. Submit detailed resume of experience and salary desired. P-1927, Engineering News-Record.

Wanted: Civil Engineer. Experienced. field. permanent position, growing construction company, near Poughkeepsie, New York. P-1896, Engineering News-Record.

Wanted: Estimator and Field Engineer. experienced, permanent position, growing construction company, near Poughkeepsie N. Y. P-1921, Engineering News-Record.

Senior Estimator—primarily highway. five years or more experience covering takeoff, field exploration, pricing and handling subcontracts. Salary commensurate with ability. Location Midwest. Send resume and picture. P-1890, Engineering News-Record.

Have opening for several recent Civil Engineer Graduates with military obligations completed who desire to learn the construction business. Ambitious, aggressive, dependable, use no intoxicants, willing to start in the field of industrial buildings and heavy construction, and willing to move. Must be single. We operate throughout Kansas and adjacent states; offer excellent opportunity for advancement. Top wages. Martin K. Eby Construction Co., Inc., P.O. Box 1679, Wichita, Kansas.

Wanted—2 or 3 experienced detailing engineers for reinforcing bars, steel joist & similar products to be located in North Carolina. Old established firm with good working conditions, fringe benefits, trust funds, etc. State age, single or married, education, experience, salary desired, etc. P-1929, Engineering News-Record.

Experienced Estimator wanted by West Coast firm engaged in General Construction of Commercial and Industrial work. Permanent position. Salary open to right man. Registered Engineer preferred. Send complete resume stating expected salary. P-1889, Engineering News-Record.

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Const. Foreman or Asst. Supt., 37. Prefers overseas employment but will accept domestic job. 20 yrs. experience commercial industrial construction. Seeking immediate employment. Good references. PW-1760, Engineering News-Record.

Bituminous & Soils Engineer. 28. BS. 6 years experience all phases bituminous concrete and soils work pertaining to highway projects. Includes pavement mix design, quality control of hot-mix plant operations, paving supervision, soil compaction control, etc. Desires to combine bituminous and soils background into permanent position with established organization. PW-1789, Engineering News-Record.

Construction Engineer Manager—Total 32 years experience all phases. Many years foreign. Interested only in administrative position at top level. Prefer to locate in Spanish speaking countries or Southwest United States. PW-1855, Engineering News-Record.

Construction Engineer. MIT graduate licensed. estimating, job management heavy construction 8 yrs. exp. legal training New England area. PW-1849, Engineering News-Record.

Project Engineer—P.E.—B.S.C.E.—35—Experienced Designer and Construction Manager for large industry; responsibilities include structural, mechanical and electrical installations. Desires responsible position. PW-1848, Engineering News-Record.

• POSITIONS WANTED

Sanitary Engineer. BSSE. PE. 13 yrs. experience including design, estimates, specifications, supervision at section head level. Complete resume and references upon request. PW-1865, Engineering News-Record.

Graduate Civil, age 34, wants to enter heavy construction field with contractor. Experience with highway departments and field and office work for consultant. Right job consultant. Right job acceptable anywhere, but prefer West or Midwest. PW-1870, Engineering News-Record.

Construction Engineer. Mechanical—Fifteen years with A. & E. firms and Gen. Contrac's. Broad experience in Industrial & Commercial Buildings plus Dept. of Defense Facilities. Desires position as Resident Engineer or Field Engineer, preferably near West Coast. PW-1868, Engineering News-Record.

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Piping and Instrument Superintendent. 18 years of heavy construction experience, chemical plants, pumping stations and power plants. U.S.A., Europe or South America. PW-1781, Engineering News-Record.

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Project Manager. Proven 20 Year Record heavy construction. U.S. and foreign. PW-1883, Engineering News-Record.

Civil Engineer. 34. 10 Years experience in all phases bituminous concrete work in highway and airport construction including estimating and bidding. Desire relocation in northeast. PW-1901, Engineering News-Record.

Project Manager or superintendent. Electrical construction experience in generating stations, industrial plants, sub-stations, transmission lines and distribution systems. Will relocate. PW-1903, Engineering News-Record.

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W-1834, Engineering News-Record
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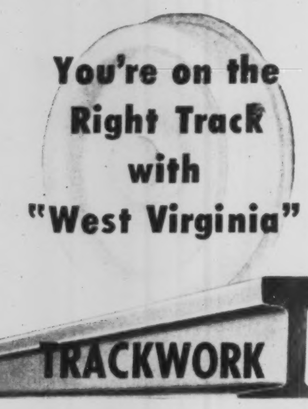
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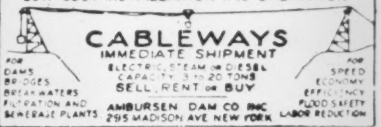

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Editorials

Costs and Bid Prices

THIS ISSUE CARRIES ENR's second quarterly cost report: It features highway costs. For costs in general the conclusion is—unfortunately—that they will continue to go up. Costs to constructors will go up; financing costs will go up; final costs to owners will certainly go up.

In highways, however, we have an anomaly. Despite rising costs facing contractors, a fierce competitive situation is keeping highway prices in the bargain class for the states and the federal government. Bid price indexes in all states reporting show drops from previous highs, appreciable drops.

The situation raises a serious question, which we have voiced before: Can there be profit in bid prices that look so low against engineers' estimates and against a pattern of rising costs? It is to be hoped there is. It is to be hoped that improved productivity can keep highway prices down and still let contractors share in the savings to owners. If this is to be, however, contractors must continue to improve their methods. And most importantly, they must know their costs—of materials, manpower, machinery and money. It is to this end—for a knowledgeable, cost-conscious industry that will find profits even in prices defying cost-spiral pressures—that this issue's highway cost report and outlook is presented.

Inspection Can Avert Failures

THE NEED FOR DESIGNER INSPECTION of construction is often borne out by analysis of the causes of structural failures. In fact, one community in which a building collapsed a few weeks ago is now preparing a law that will revoke a building permit for a project unless the engineer who designed it also takes responsibility for compliance with the plans. This may well be the beginning of a much-to-be-desired trend.

Some failures may have been due to contractor carelessness, which conceivably could have been discouraged by the presence of competent engineering inspectors. And some mishaps may have been the result of design deficiencies, which engineers could have eliminated by designing for anticipated loads not covered by the minimum requirements of building codes. But by far the majority of the collapses is traceable to other causes that could have been averted if the structural designers had been in a position to insure that their projects were built in accordance with their designs.

One significant cause of structural failure, for example, is underdesign by someone other than the consulting structural engineer. In those cases, the owner or architect has allowed another party to design or redesign structural framing to cut costs. This type of failure is unlikely to happen if the consulting engineer's contract requires him not only to design the framing but also to check any redesign and to see that the plans are carried out in the field.

Other important collapse causes are a contractor's misinterpretation of plans or his decision to carry out erection in a manner not anticipated by the designer. Inspection of construction by the designer could eliminate both of these causes.

Although the number of structures involved in failures is only a minute percentage of all new structures, the situation is serious. People have been injured and killed. Property losses run to a substantial figure. And the reputations of everyone connected with these unfortunate projects are tarnished, deservedly or not.

These failures can and should be prevented. Designer inspection of construction is an effective means to achieve this result—voluntarily, if possible; by legislation, if necessary.

Unity in Canada

THE PROPOSAL to join the Engineering Institute of Canada and the Canadian Council of Professional Engineers into a single national engineering organization (see p. 43), now being voted on by the members of both bodies, is worthy of careful study in this country. At the same time, any temptation to regard the Canadian plan as an exact blueprint for engineering profession unity in the United States should be resisted. Conditions in our two countries differ too substantially for that.

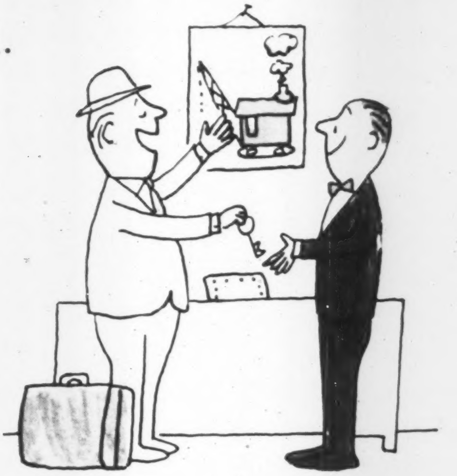
The Engineering Institute of Canada encompasses all branches of engineering, and to that extent affords a degree of unity already. In the U.S., where each branch has long had its own society, similar unity is only possible through federation, and this has been accomplished through Engineers Joint Council. Neither EIC nor EJC, however, has been able to achieve complete unity because the organizations concerned with engineer licensing are separate. Bringing EIC and the Canadian Council of Professional Engineers together is planned to give Canada the complete unity that is desirable. If the National Society of Professional Engineers would join EJC, something near the same condition would obtain in the U.S.

To this extent the situations in the two countries are comparable. There are, however, differences that must be taken into account. Only 32,000 engineers are involved in Canada, and the minority are in EIC. In the U.S. nearly 300,000 engineers are represented in EJC, while NSPE's membership is only about 50,000. In Canada the provincial professional associations are legally constituted to control the practice of engineering while this is not the case with the state societies in the U.S.

But taking differences into account, the Canadian plan for unity should offer some valuable guides to U.S. unity efforts. It is a welcome development.

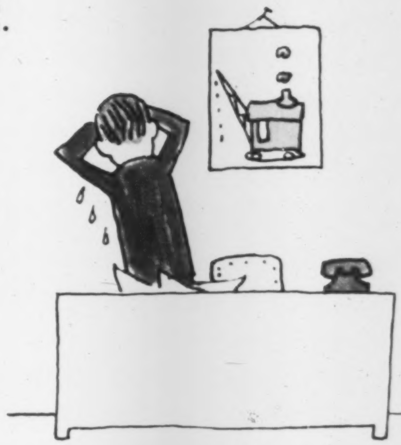
Builder Tully's words of wisdom

1.



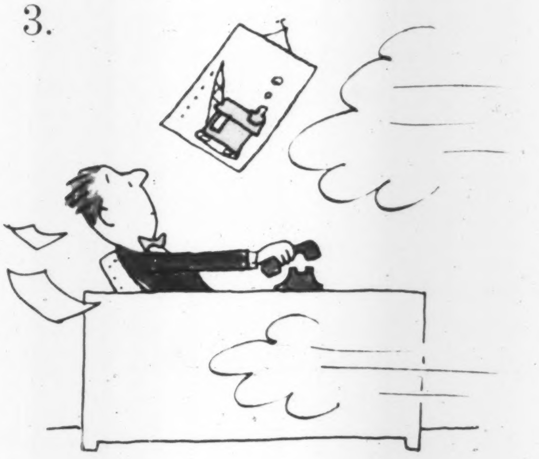
"I've been a builder forty years," Phil Tully told his boy,
"I'm giving you my company, my greatest pride and joy."
Now, sound advice was also part of Tully's legacy:
"Get Travelers for construction bonds—a solid policy."

2.



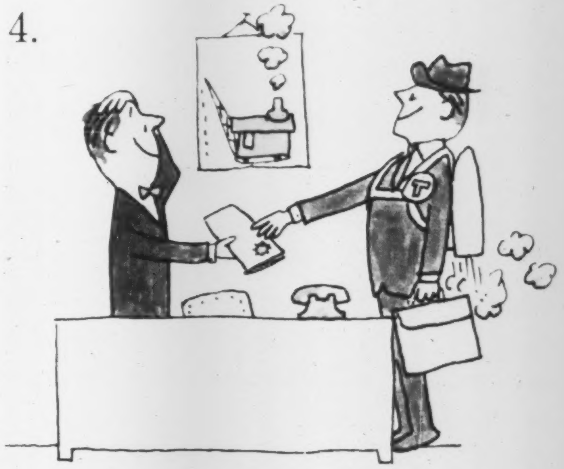
As boys are wont to, Tully, Jr. flouted Dad's advice—
He figured bonds were all alike, and *any* would suffice.
He did not call The Travelers when a big job came along—
He couldn't enter *any* bid—his bond was late and wrong.

3.



"I'll never make the same mistake again," our hero swore,
"My patriarch advised me right; it's Travelers evermore."
That day he called The Travelers, "Hasten! Satisfy my need:
I want a bond—I want it fast—with supersonic speed."

4.



He hung the telephone back up and wow! Was he surprised—
Before his eyes was Travelers' man, as fast as advertised.
Why let a tardy bond derail *your* well-laid bidding plan?
For speedy bonds and expert service get a Travelers man.

NOTE: *Comp. Equipment Floaters—Builders' Risk Insurance, too*
Are other ways The Travelers helps a contractor like you.

THE TRAVELERS
Insurance Companies

All forms of business and personal insurance including Life • Accident • Group • Fire • Marine • Automobile • Casualty • Bond

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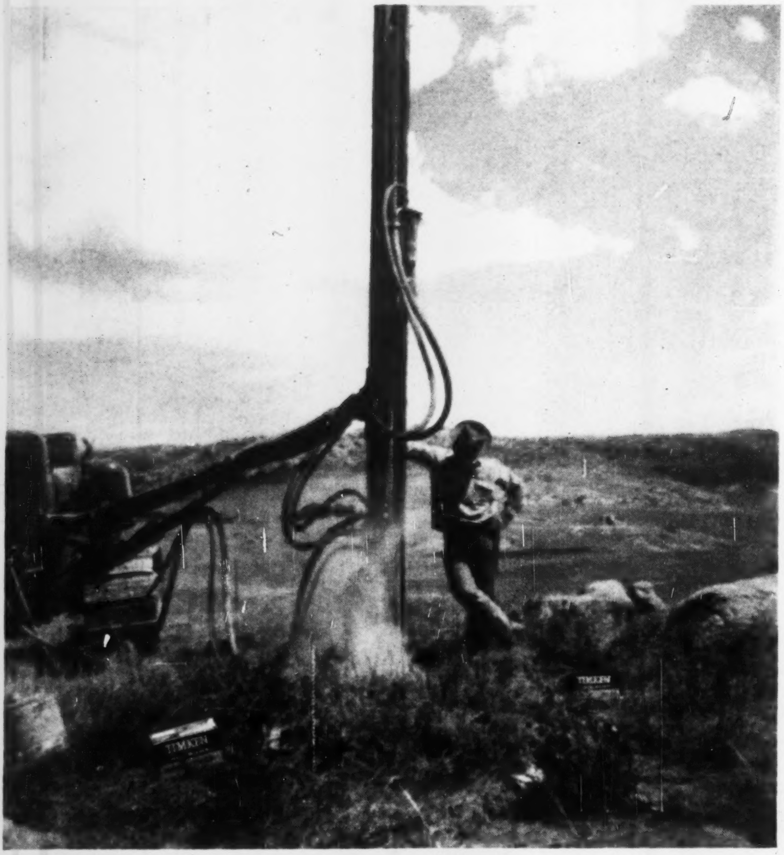
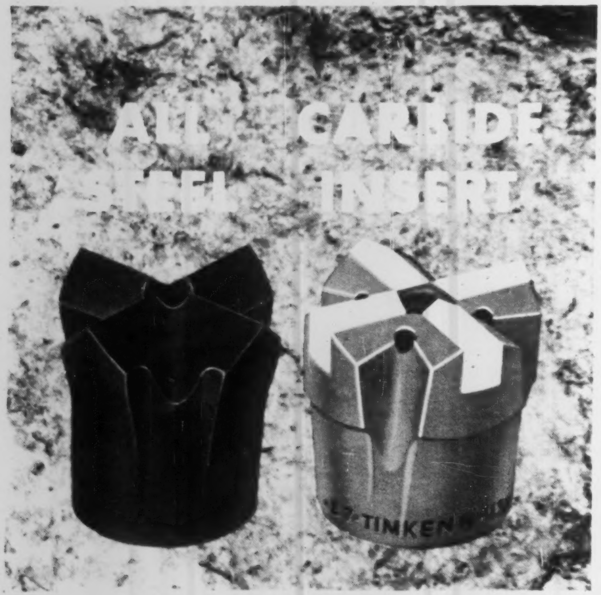
Special report from H-E Lowdermilk, Inc.

LOCATION: U.S. HWY. 287, LARAMIE, WYOMING

Operating conditions: granite and schist

H-E Lowdermilk, Inc. of Virginia Dale, Colo., had to drill through hard abrasive ground—mostly granite and schist—in constructing U.S. Highway 287 between Ft. Collins and Laramie. So they chose Timken carbide insert bits and drilled 15% more feet-per-bit! And they drilled faster, too, because the Timken bits stayed sharper longer than other bits they had used.





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The Timken carbide insert bit is your most economical bit in hard, abrasive ground. But in softer ground, use the low-cost Timken all steel multi-use bit. And because both bits are interchangeable in the same thread series, you can switch bits when the ground changes. Dozens of different Timken bits fit the same drill steel. Both are made from Timken electric-furnace fine alloy steel, have special shoulder unions that protect threads against drilling impact. For help in selecting the right Timken bit for your job, phone or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

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